

COAL AGE

Vol. 6

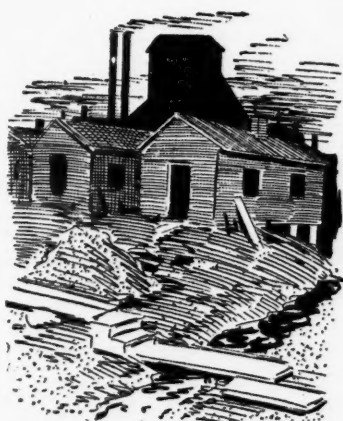
NEW YORK, JULY 18, 1914

No. 3

Take Your Choice

BY BERTON BRALEY

Written expressly for Coal Age



One Operator's plant is black
With smoke and everlasting dust,
The grounds are filled with slate and slack
The grass is blighted with a crust
Of soot and dirt; the very air
Is full of flying dust that clings
And round the coal plant everywhere
Are ugly sights and ugly things.

The yards are bare, the town is bleak,
The miners' homes are shanties small,
All foul and brackish runs the creek
And smoke hangs heavy as a pall;
Squalor and misery are plain
And life is dull and gray as slate,
And in men's faces there is pain
And hopelessness and sullen hate!



But—here's a pleasanter design,
A plant that's bright and fresh and clean,
And round this colliery and mine
The trees and grass are growing green,
The miners' homes are homes indeed,
Within the yards the children play,
And in the people's eyes we read
That life is neither harsh nor gray!

I don't know which plant pays the best,
Which yields the biggest dividends,
But I know where the owner's blest
With miners who are men—and friends,
And when these operators meet
The fate of all humanity
And face the Final Judgment Seat
—I know which one I'd rather be!

Looking Backward and Forward

Coal-mine managers and superintendents are experiencing many disagreeable tasks this summer. Quota sheets, of little value heretofore, are being studied and scrutinized with almost loving care. Conferences are frequent to determine just how few men must be retained to do the work absolutely necessary to the safe operation of the mine.

That manager or general superintendent feels that his chief work consists in finding where another man can be cut out or some one's wages reduced. We still have many men in the business who are never happier than when the occasion arises to use the pruning knife; while in numerous cases it will be found true that it is due to these very men that the excessive use of it becomes necessary. On the other hand those officials who hate to see men laid off and wages reduced are losing sleep and thinking hard how to make the best of poor conditions.

Let us see how this looks from the viewpoint of "Hindsight" with the idea of applying "Foresight." Have you ever considered how many men will be laid off during a dull period who could really have been dispensed with before? Did you ever attend any conferences to discuss the minimum number of men necessary to run the plant when the output was at top notch?

Of course we all know how cost decreases and how nice the total cost looks when there is a big, steady output; but somehow that is about all we consider then and we fail to see that \$500 saved in prosperous times is as good in the surplus as \$500 saved in lean times.

The point we are trying to emphasize is that very few of us can stand PROSPERITY in the sense of saving all that is possible during prosperous periods as well as in dull times. It's the same idea the savings banks are always drilling into us—to save during the period of productiveness and plenty.

I know of a mine that produces from six to eight hundred tons a day when orders are in plenty. It employs a weighman, a first-class head tippelman, and in addition a tippel foreman at \$2.50 per day. It was not difficult to retain the foreman when his cost per ton could hardly be noted on the cost sheet, but now since the mine can only run three days a week, the company finds that they can easily dispense

with him and shift his duties to the head tippelman who is glad to assume them in order to hold his job through the dull season. It is evident to anyone that an increase of 50c. per day for the head tippelman would have made him jump at the chance to be called tippel foreman and the company would have saved \$2 per day all through the period the mine was running steadily.

Look over your schedule of reductions and see if you don't find a few cases where you have laid off some men who could have been spared before.

Make Foresight of Hindsight

Now let us look ahead, and, as they say in the lodge room, "Proceed with caution." It won't be long 'till your output picks up. You will naturally feel elated over a return to normal operations. You will probably feel so good that when your foreman begin to increase forces along the line you won't scan your quota sheets as closely as you have. There will be a request for the reinstatement of the tippel foreman and the principal argument in favor of putting him back will simply be the fact that he has always been there.

Will you be able to say, "I know that, but we didn't need him and we're going to get along without him. The head tippelman at the same rate is doing his work fine." If you can reason it out this way and stick to it you will have applied hindsight to foresight and will save your company money thereby.

It is true that experience is the best teacher, but it is too dear and costly a school to go to all the while. The education it affords will finally absorb both your time and profit unless you draw the line NOW and apply what you learn in dull times to the season of prosperity which is sure to follow.

The main thing for managers and superintendents to fix firmly in their minds and not forget is the fact that the earning power of a dollar saved in prosperous times is just as big as that of the dollar saved in lean years. The application of this knowledge to routine coal-mine operations as to number of men employed, material used, etc., will certainly help you to go through the next dull period without having to admit that you have been paying too many men and using too much material all along.

The Rope Drive in Breaker Operations

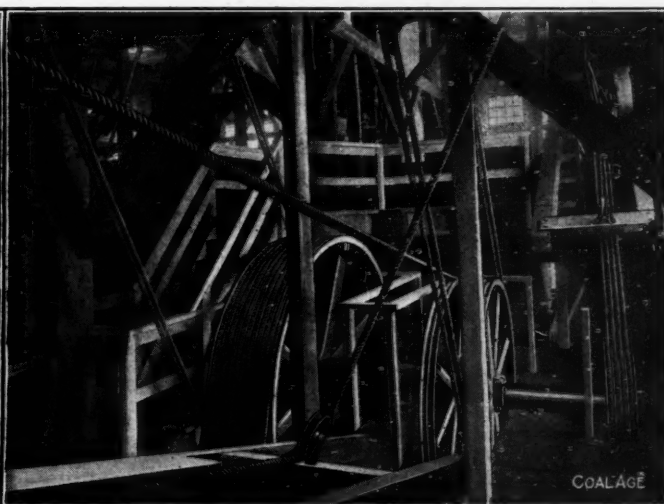
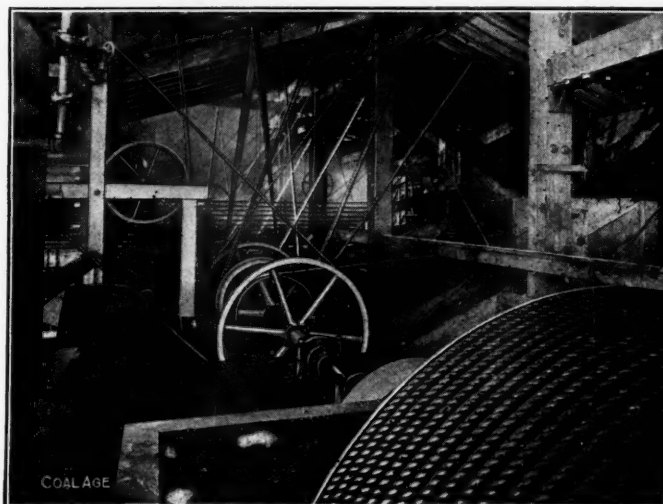
BY CHESTER REESE*

SYNOPSIS—In many anthracite breakers the rope system of power transmission has been found more advantageous and less expensive than flat belts. In some instances only the main drive is made by means of ropes, while in others practically the entire distribution is thus accomplished.

Removing coal from the depths of the earth is no more the sum total of mineral-fuel production than felling in the forest is all there is to the manufacture of lumber. Coal, as brought from the mine, must be prepared for market by the elimination of slate and bone, and in many instances, at least, by separation into various commercial or prepared sizes.

When plans were first made for the Harwood breaker, the superintendent, A. W. Drake, adopted a conveyor system for carrying the coal to the point where preparation began, as against the proposed arrangement of hauling up cars by wire cable and dumping them at the head of the breaker. At the same time, after thorough investigation, he selected the rope drive as an effective and desirable method of transmitting power.

Rope drives are peculiarly adapted to breaker work. The rope is long-lived, and can be replaced at little cost. The transmitting element being divided into a number of narrow units placed side by side with spaces between them is much less injured by fine particles of coal and dust than is a single wide strand. Slipping, due to sud-



INTERIOR OF NATALIE AND HARLEIGH BREAKERS, SHOWING POWER DISTRIBUTION

Especially for anthracite is the work of preparation important, in order that this admirable fuel may be furnished clean and in correctly graded sizes. For this reason, the breaker, in which the cleaning and grading is done, together with the enormous piles of culm which have accumulated in past years have become a characteristic feature of the landscape throughout the coal fields of eastern Pennsylvania.

The crushers, screens, picking tables, chutes, etc., in the breaker are so arranged as to utilize the force of gravity in the flow of the material in its passage through the building. The structure is, therefore, high at the point where the coal enters, sloping off and broadening out as the descent and preparation proceed.

The history of the development of anthracite preparation is largely written in the development of such plants as the Harwood breaker put into operation near Hazelton in 1898 by Calvin Pardee; the Lattimer and Boston breakers, also near Hazelton; the Delaware and Hudson breakers, near Scranton; the Beaver Brook, near Audenreid; the Harleigh, near Jeddo; and the St. Clair and Natalie breakers, near Pottsville.

*Dodge Mfg. Co., Mishawaka, Ind.

den shocks, is eliminated, wear is reduced, and greater uniformity of rotation is insured.

One of the distinctive features of the Lattimer breaker owned by the Pardees was that it was built without a drawing, from a complete model with rope drives, tension carriages, chutes, etc., built to scale of one inch to the foot. The rope drives in this breaker, which were duplicates of the Harwood job, were furnished, as were the former, by the Dodge Manufacturing Co., of Mishawaka, Ind., and have been completely successful. From the beginning, there is good reason to believe that the cost of maintenance has been lower and the efficiency higher compared with the tonnage of coal handled than in any of the belt-driven breakers.

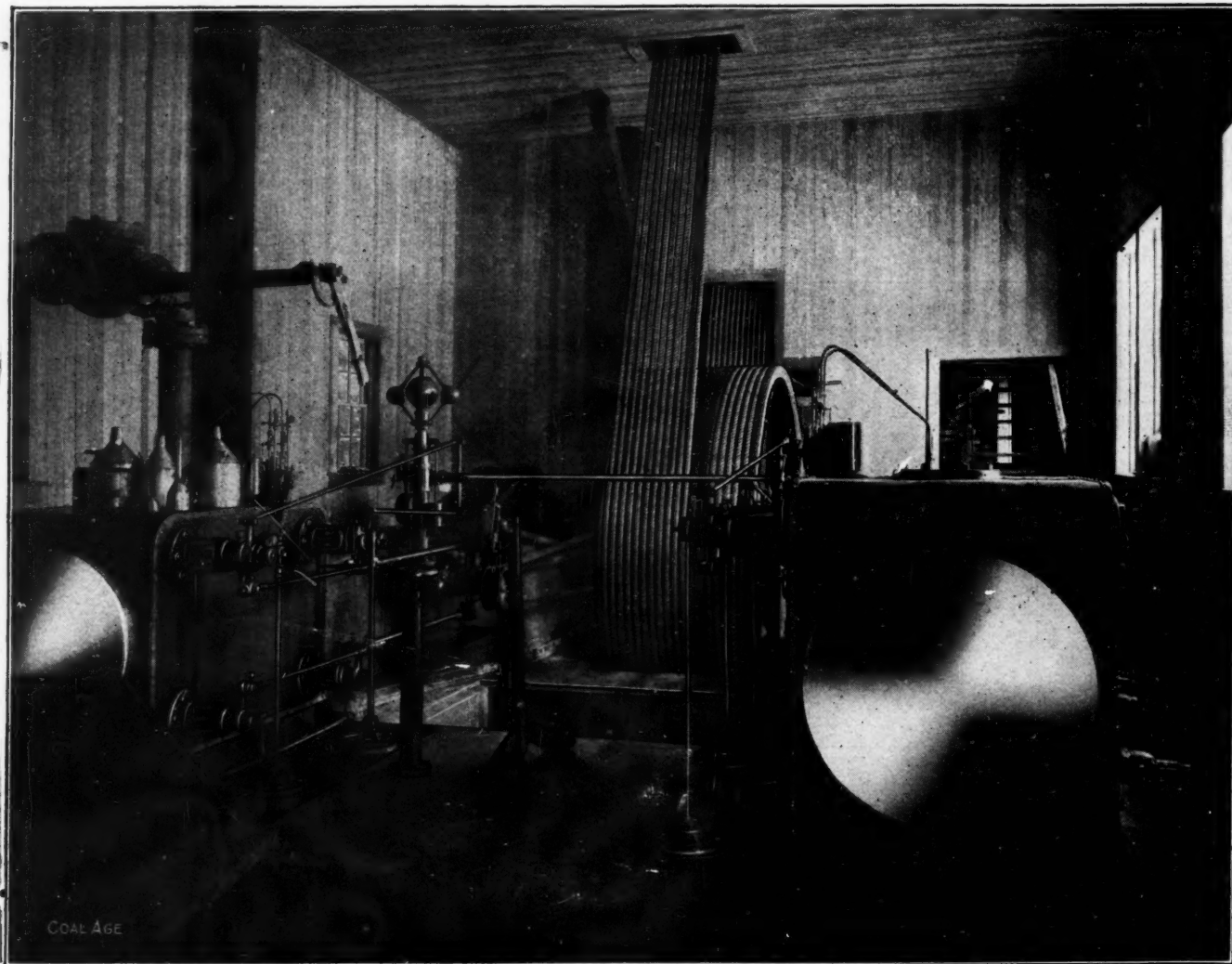
The idea of building the Lattimer breaker from a complete model was a suggestion from George Van Derhoef, Eastern consulting engineer of the Dodge Manufacturing Co. This scheme saved considerable expense in building, as there was no interference between the ropes or tension carriages, and the chutes or spouts to carry the coal through the breaker.

The Beaver Brook breaker was designed to prepare 1000 tons of coal per day of ten hours, but so well bal-

anced is the entire equipment and so economical the power transmission that at times as much as 1500 tons have been run through the building, and even higher tonnages might have been handled were it possible to secure the same from the mines.

Here the entire mechanical equipment is driven by a steam engine, which cannot develop more than about 250 hp., this machine being of a lower power than that in use in any other breaker of equal capacity. This signifies, of course, that the system of power distribution is

A 10-ft. flywheel on the engine is grooved for 12 wraps. The ropes extend horizontally from this wheel through the intervening passageway, in which is located the tension carriage, and pass thence into the breaker building, turning upward over suitably placed idlers, which give them a fair lead to the driven sheave on the main line shaft above. In this main drive are included all the smallest details of correct design for the conditions to be met. It has, therefore, proved perfectly satisfactory for the purpose in hand.



THE MAIN DRIVE OF THE HARLEIGH BREAKER

direct and generally efficient and that the equipment is so installed and maintained as to waste less energy in any of the numerous ways common to installations of the ordinary sort as to enable an engine of low power to carry the total load.

The breaker equipment is so arranged as to keep the center bent of the structure clear of coal-carrying or handling machinery, thus leaving this space free for the unhampered installation of the transmission equipment. Rope drives are employed for all the important units. Their use made possible the highly desirable feature of placing the engine in a building separate from the main structure, the drive lending itself readily to the quarter turn necessary in reaching from the outside engine room to the main jack-shaft line on the third floor inside the breaker.

This is a notable example of the adaptability of the rope drive, not only to the work of carrying the total power of an engine from the flywheel to the line shaft, but also for distribution to the individual members of the operative or productive machinery. This "nothing-too-big, and nothing-too-little" feature of the system is one, the importance of which is not as generally known and appreciated as it rightfully should be.

The accuracy of the plans in the proper balancing of the equipment, the arrangement of chutes, proportions of screens, etc., were such that when the time came for starting the breaker, the "day of reckoning" for the designers and builders, the machinery operated so smoothly that not a single change was required. Only 70 minutes of time were lost by small stoppages, and 40 per cent. of

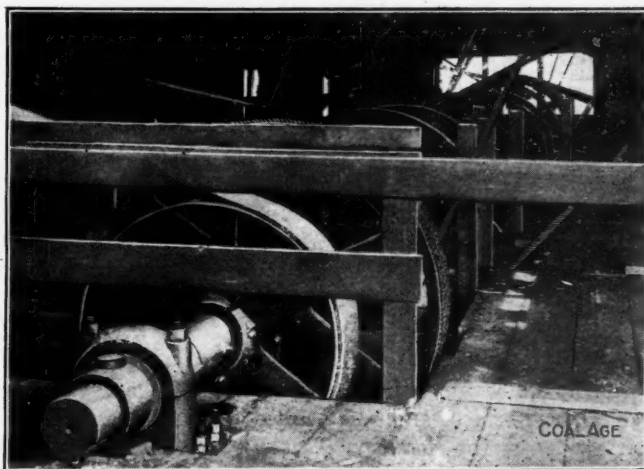
the total capacity of the breaker was run through in good condition upon that first day.

This breaker was started on Mar. 16, 1910. From that time until the present, there have only been three days of idleness attributable in any way to the necessity of attention, repairs, cleaning or adjustment of the machinery. This record speaks for itself, and needs no corroborative or collateral testimony as to the intelligence of design or character of the equipment employed.

In the Boston breaker of the Mill Creek Coal Co., there are two main drives of the continuous type of 185 hp. each, and 22 smaller drives. The Delaware and Hudson breakers are similar in make-up to others in the anthracite region. The original plans called for other means of power conveyance than rope transmission, but were rearranged after investigation of the possibilities of this system.

The Harleigh breaker of G. B. Markle & Co. was originally designed to be driven by belts, all the drawings, in fact, having been made up with this idea in mind. The management, however, became interested in the possibil-

American system of rope transmission. The power is delivered from an engine to one central jackshaft and distributed therefrom to the different power shafts or machines. One of the distinctive features of the equipment in the St. Clair breaker was the use of standard

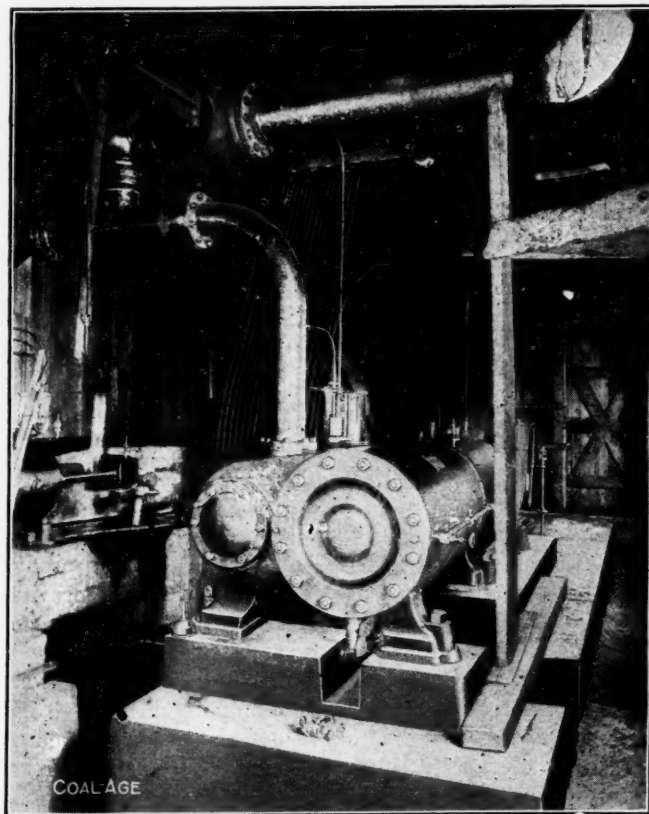


LINE SHAFT IN ST. CLAIR BREAKER

ball-and-socket pillow blocks on the main line shaft. This, it is believed, was an entirely new departure from general practice.

The simplification of the design of the transmission machinery reduce the cost over the original belt-driven breaker by a considerable margin. It will also doubtless cut down the expense of maintenance considerably, although the breaker has not been in operation sufficiently long to make a fair comparison. This plant is somewhat larger than the others above mentioned, having a capacity of about 2500 tons of prepared coal per day.

The Natalie breaker, owned by the Colonial Collieries Co., is equipped similar to the Beaver Brook breaker, although the engine is not placed outside of the building, nor at right angles to the line shaft. A still further advance in power-transmission equipment is here embodied in the use of self-lubricating, dust-proof, ball-and-socket pillow blocks for the main line shaft. It is believed that these are the first pillow blocks of this kind ever used for this purpose.



MAIN ENGINE DRIVE OF THE NATALIE BREAKER

ities of rope driving with the result that this system was finally adopted. This breaker was a departure from the general plan adopted in the anthracite region, and was designed by the general manager, Mr. Loomis, assisted by J. Kemberger. The height of the building is much less than the ordinary breaker, the coal coming in at a lower level. The general plan of power distribution was, however, similar to that employed in other breakers. It has been a success from the start, both in the preparation of coal and in the operation of the transmission equipment. The St. Clair breaker, of the St. Clair Coal Co., was originally belt driven, but when redesigned after a disastrous fire it was finally decided to adopt the

The Illinois Coal Mining Investigations, a cooperation between the Department of Mining Engineering of the University of Illinois, the State Geological Survey and the U. S. Bureau of Mines, has divided the State into eight districts in order to group together mines operating under like physical conditions. Bulletin 4, Coal Mining Practice in District VII, by S. O. Andros describes methods of mining in the largest of the districts. District VII comprises Bond, Clinton, Macoupin, Madison, Marion, Montgomery, Moultrie, Randolph, St. Clair, Shelby and Washington Counties, together with that portion of Perry County west of the Duquoin anticline and those portions of Christian and Sangamon Counties in which bed 6 of the Illinois Geological Survey correlation is mined. The annual coal output of this district is over 22 million tons from 196 mines. This amount is 39.1 per cent. of the total production of Illinois. The use of undercutting machines has been a factor in increasing the per capita production of employees which for this district is 5.1 tons daily as compared with 4.5 tons for the State as a whole. The number of deaths per 1000 employees is the same (2.3) for District VII and the State. This Bulletin has 34 illustrations, many of which are flash-light photographs of various phases of the mining of coal and the text describes in detail mining operations in the district, giving the costs of each step in the progress of coal from the working face underground to the tippie on the surface. Copies may be obtained from the Illinois Coal Mining Investigations, 126 Natural History Bldg., Urbana, Ill.

Adjustment of Coal-Land Values

BY RALPH D. BROWN*

SYNOPSIS—The high price of coal land is fostered by the failure to tax mineral when held by farmers and others. Such owners, not feeling the burden of taxation, only part with their land when the price is made attractive. When coal land has been bought, however, the taxes are usually so high and the necessary time of holding unused so long that the public compensates the operator not too liberally, yet at great expense, for his land-carrying charge. In most cases leases are more economical than purchases, and the writer recommends that they be made to provide for an equal division of profits between lessee and lessor.

The public at present is demanding valuations of the property of many of the industries for the purpose of regulating rates and determining what are equitable assessments for taxation. Public sentiment has also been turned to a consideration of the conservation of resources. To what extent these tendencies may be carried

Market prices. 2—Forced sales. 3—Royalty values. 4—Capitalized estimated profits. 5—Value of the yearly product.

The objections to the first two methods, which are those most generally employed, are almost identical. Primarily they encourage wasteful methods of production. Sale prices are also never stable, due to political and economic changes, and are always influenced by speculation. Temporary demand or individual transactions should never establish values for an entire district.

A royalty rate common in a particular field often gives a fair indication of local values, but it is open to the sweeping objection that it is a stable quantity not adjustable to varying conditions and economic changes.

The fourth method involves varying standards and requires too many approximations to arrive at any unbiased basis of value. Whenever we consider the future as a contributory asset to any business our computations become mere speculations.

State	District Rep.	Thickness of Coal, Ft.	Value, Dollars, per Acre	Royalty, Cents per Ton	Note on Taxation
Alabama.....	Warrior.....	3-10	50-200	8-15	\$1.30 based on 60 per cent. of valuation
Colorado.....		4	Av. \$18 1907-1913 Gov. Report		Full cash value + $\frac{1}{2}$ gross output + net profit of preceding year
Illinois.....	Central.....	5-6	30-75		Assessed at full value
Illinois.....	Franklin Co.....	6-12	50-100	5-7	Assessed at \$35 per acre
Illinois.....	Southern.....	5-9	50-200	2-6	8% on $\frac{1}{2}$ of assessed value
Indiana.....	Central.....	3 $\frac{1}{2}$ -8	50-100	2 $\frac{1}{2}$ -4	Assessed at \$35 per acre
Indiana.....	Southern.....	3 $\frac{1}{2}$ -8	50-100		
Iowa.....				7	
Kansas.....	Pittsburg.....	2 $\frac{1}{2}$ -3	85-125	6-10	\$1.80-2.50 per \$100 value
Kentucky.....	Western.....	5-6	5-50	5	\$1.66 $\frac{1}{2}$ on 80 per cent. of assessed valuation
Maryland.....				7	
New Mexico.....	Gallup.....	3-7	10-20		
Ohio.....	East Central.....	3 $\frac{1}{2}$ -6	50-200	4-7 $\frac{1}{2}$	Assessed value \$15-30
Oklahoma.....	McAlester.....	4 $\frac{1}{2}$	50-300	8	No tax, Government land
Pennsylvania.....	Central.....	3 $\frac{1}{2}$ -4 $\frac{1}{2}$	200-800	10-20	Cambria Co. assessed at full value
Pennsylvania.....	Western.....	6-9	250-1500		
Pennsylvania.....	Connellsville.....	6-8	10-50	10	\$1.96 per \$100 on valuation \$12.00
Tennessee.....		2 $\frac{1}{2}$ -4 $\frac{1}{2}$	150-400	10-12 $\frac{1}{2}$	Assessed at \$100-150 per acre
West Virginia.....	Fairmont.....	5-8	100-250	6-12	98 mills on \$45 per acre
West Virginia.....	Southern.....	4-8	30-450	8-17 $\frac{1}{2}$	Taxed on output
Wyoming.....		4-60			
Washington.....		4 $\frac{1}{2}$ -5	250-1600	10-25	

is unknown, but judging from the radical restraining laws enacted by many legislatures, the industries closely dependent upon natural resources may prepare for regulation.

At present the coal-mining industry has experienced its share of notoriety and adverse legislation. This is almost entirely the result of the labor agitation and of the unrest which is sweeping the country. Drastic laws are being introduced in both the federal congress and many state legislatures. If these are passed, they will not only force an undue hardship on an industry already near bankruptcy, but will affect the whole industrial world and hinder the cause of conservation.

It is therefore vital that those who have investments in coal lands see that any valuations and appraisals do not exceed the limits which should be put upon them by economic justice, and that no statutes be enacted which do not accord with such principles.

VALUATIONS FOR TAX ASSESSMENTS

Ordinarily, appraisal valuations are made for the purpose of assessing taxes. The present methods of basing values for taxation are varied and mostly unjust. They are based on the following determining factors: 1—

If the assessment is based on the past yearly production certain advantages are evident. Funds are provided when funds are needed and the industry shares its proportionate burden. Wyoming assesses taxes directly on the production. Colorado, Arizona and Pennsylvania also have similar laws. In order to impose no injustice on any one field, the regulation of assessments should be undertaken by the federal government. This would greatly aid the cause of conservation.

An example of injustice found in some districts is the exemption of coal lands from taxes when they are not owned by an operator or by capitalists seeking an investment. Whenever the transfer of title is made to a possible operator, then the mineral right becomes subject to a tax over and above that already assessed on the surface. An injustice of this nature hinders economic development in localities thus affected.

As we stop to review the many radical laws passed to saddle unjust burdens upon the mining industry, the necessity for concerted action becomes more apparent. Let us pass this point, however, and endeavor to discover a method by which values may be maintained at their proper level in order that a fair profit may be made on the investment and the public receive a reasonable service.

*Chief engineer, O'Gara Coal Co., Harrisburg, Ill.

FACTORS WHICH DETERMINE TRUE VALUE

The factors determining the value of any coal land are numerous. The following are mentioned as perhaps the principal items:

1—Quality and character of the fuel. 2—Cost of placing the coal on the market. 3—Supply and demand. 4—Time element of exhaustion. 5—Legal restrictions and taxation. 6—Competition and proximity to a market. 7—Railway rates. 8—Value of the surface above the coal. 9—Accessibility and regularity of bed. 10—Hazards of mining. 11—Speculation. 12—Character of labor available.

When we consider the fact that 8 of the 12 factors are variables the complexity of the problem becomes apparent. The United States Geological Survey has endeavored to place values on the government lands held for entry. It has considered the royalty method as best adapted to the conditions and then proceeds somewhat as follows:

V = Value of any particular coal in dollars per acre;
 MD = Minimum workable depth taken as 3000 to 5000 ft.

D = Depth of bed in question;

$B.t.u.$ = Heat value of coal;

t = Thickness of coal in feet.

The result from such a calculation is merely arbitrary, but aids in checking abnormal values obtained by other methods.

LONG-TERM LEASES ON PROPERTY MORE VALUABLE THAN OWNERSHIP

The present tendency of mine owners is to buy the title to the coal rights and assume all taxes, risks and profit or loss in the future. There are many cases, however, when such procedure is not economical. Due to the time element, there is a period in the time of operation of a property when it may be cheaper to lease at a

COMPOUND INTEREST TABLE AT VARIOUS INTEREST RATES

Amount of One Dollar Compounded Annually for Periods of 1 to 100 Years

Years	1/2%	1%	1 1/2%	2%	2 1/2%	3%	3 1/2%	4%	4 1/2%	5%	5 1/2%	5 3/4%
1	1.0050	1.0100	1.0150	1.0200	1.0250	1.0300	1.0350	1.0400	1.0450	1.0500	1.0533	1.0550
2	1.0100	1.0201	1.0302	1.0404	1.0506	1.0609	1.0712	1.0816	1.0920	1.1025	1.1095	1.1130
3	1.0151	1.0303	1.0457	1.0612	1.0769	1.0927	1.1087	1.1249	1.1412	1.1576	1.1687	1.1742
4	1.0202	1.0406	1.0614	1.0824	1.1038	1.1255	1.1475	1.1699	1.1925	1.2155	1.2310	1.2388
5	1.0253	1.0510	1.0773	1.1041	1.1314	1.1593	1.1877	1.2167	1.2462	1.2763	1.2967	1.3069
6	1.0304	1.0615	1.0934	1.1262	1.1597	1.1941	1.2293	1.2653	1.3023	1.3401	1.3658	1.3788
7	1.0355	1.0721	1.1098	1.1487	1.1887	1.2299	1.2723	1.3159	1.3609	1.4071	1.4387	1.4547
8	1.0407	1.0829	1.1265	1.1717	1.2184	1.2668	1.3168	1.3686	1.4221	1.4775	1.5154	1.5346
9	1.0459	1.0937	1.1434	1.1951	1.2489	1.3048	1.3629	1.4233	1.4861	1.5513	1.5962	1.6191
10	1.0511	1.1046	1.1605	1.2190	1.2801	1.3439	1.4106	1.4802	1.5530	1.6289	1.6813	1.7081
11	1.0564	1.1157	1.1779	1.2434	1.3121	1.3842	1.4600	1.5395	1.6229	1.7103	1.7710	1.8021
12	1.0617	1.1268	1.1956	1.2682	1.3449	1.4258	1.5111	1.6010	1.6959	1.7959	1.8655	1.9012
13	1.0670	1.1381	1.2136	1.2936	1.3785	1.4685	1.5640	1.6651	1.7722	1.8856	1.9650	2.0057
14	1.0723	1.1495	1.2318	1.3195	1.4130	1.5126	1.6187	1.7317	1.8519	1.9799	2.0698	2.1160
15	1.0777	1.1610	1.2502	1.3459	1.4483	1.5580	1.6753	1.8009	1.9353	2.0789	2.1802	2.2325
16	1.0831	1.1726	1.2690	1.3728	1.4845	1.6047	1.7340	1.8730	2.0224	2.1829	2.2964	2.3552
17	1.0885	1.1843	1.2880	1.4002	1.5216	1.6528	1.7947	1.9479	2.1134	2.2920	2.4189	2.4847
18	1.0939	1.1961	1.3073	1.4282	1.5597	1.7024	1.8575	2.0258	2.2055	2.4066	2.5479	2.6214
19	1.0994	1.2081	1.3270	1.4568	1.5987	1.7535	1.9225	2.1068	2.3079	2.5270	2.6838	2.7656
20	1.1049	1.2202	1.3469	1.4859	1.6386	1.8061	1.9898	2.1911	2.4117	2.6533	2.8269	2.9177
25	1.1328	1.2824	1.4509	1.6406	1.8539	2.0938	2.3632	2.6658	3.0054	3.3863	3.8653	3.8133
30	1.1614	1.3478	1.5631	1.8114	2.0976	2.4273	2.8068	3.2434	3.7453	4.3219	4.7527	4.9837
35	1.1907	1.4166	1.6839	1.9999	2.3732	2.8139	3.3336	3.9461	4.6674	5.5160	6.1623	6.5136
40	1.2208	1.4888	1.8140	2.2080	2.6851	3.2620	3.9593	4.8010	5.8164	7.0400	7.9900	8.5130
45	1.2516	1.5648	1.9543	2.4379	3.0379	3.7816	4.7024	5.8412	7.2483	8.9850	10.3605	11.1260
50	1.2832	1.6446	2.1052	2.6916	3.4371	4.3839	5.5849	7.1067	9.0326	11.4674	13.4338	14.5413
100	1.6466	2.7046	4.4320	7.2443	11.814	19.218	31.189	50.511	81.583	131.49	180.466	211.45

Years	5 1/2%	6%	6 1/2%	6 3/4%	7%	7 1/2%	8%	8 1/2%	9%	9 1/2%	10%
1	1.0567	1.0600	1.0633	1.0650	1.0667	1.0700	1.0750	1.0800	1.0850	1.0900	1.1000
2	1.1165	1.1236	1.1307	1.1342	1.1378	1.1449	1.1556	1.1664	1.1772	1.1881	1.2100
3	1.1798	1.1910	1.2023	1.2079	1.2136	1.2250	1.2423	1.2597	1.2773	1.2950	1.3310
4	1.2467	1.2625	1.2784	1.2865	1.2945	1.3108	1.3355	1.3605	1.3859	1.4116	1.4641
5	1.3173	1.3382	1.3594	1.3701	1.3808	1.4026	1.4366	1.4693	1.5037	1.5386	1.6105
6	1.3920	1.4185	1.4455	1.4591	1.4729	1.5007	1.5432	1.5869	1.6315	1.6771	1.7716
7	1.4719	1.5036	1.5370	1.5540	1.5711	1.6058	1.6590	1.7138	1.7702	1.8280	1.9487
8	1.5542	1.5938	1.6344	1.6550	1.6758	1.7182	1.7835	1.8509	1.9206	1.9925	2.1436
9	1.6423	1.6895	1.7379	1.7626	1.7875	1.8385	1.9172	1.9990	2.0839	2.1719	2.3579
10	1.7353	1.7908	1.8480	1.8772	1.9067	1.9672	2.0610	2.1589	2.2610	2.3674	2.5937
11	1.8337	1.8983	1.9650	1.9992	2.0338	2.1049	2.2156	2.3316	2.4532	2.5804	2.8531
12	1.9375	2.0122	2.0894	2.1291	2.1694	2.2522	2.3818	2.5182	2.6617	2.8126	3.1384
13	2.0473	2.1329	2.2218	2.2675	2.3140	2.4098	2.5604	2.7196	2.8880	3.0657	3.4523
14	2.1633	2.2609	2.3625	2.4149	2.4682	2.5785	2.7524	2.9372	3.1334	3.3416	3.7976
15	2.2859	2.3966	2.5121	2.5719	2.6328	2.7590	2.9589	3.1722	3.3998	3.6424	4.1773
16	2.4155	2.5404	2.6712	2.7391	2.8083	2.9522	3.1808	3.4250	3.6887	3.9708	4.5950
17	2.5524	2.6928	2.8403	2.9171	2.9956	3.1588	3.4193	3.7000	4.0023	4.3276	5.0545
18	2.6970	2.8543	3.0202	3.1067	3.1952	3.3799	3.6757	3.9960	4.3425	4.7170	5.5600
19	2.8499	3.0256	3.2115	3.3086	3.4082	3.6165	3.9513	4.3157	4.7116	5.1315	6.1160
20	3.0114	3.2071	3.4149	3.5237	3.6355	3.8697	4.2478	4.6610	5.1121	5.6043	6.7276
25	3.9669	4.2919		4.8277		5.4275		6.8486		8.6228	10.8366
30	5.2256	5.7436		6.6146		7.6123		10.0628		13.2689	17.4496
35	6.8828	7.6862		9.0626		10.6768		14.7856		20.4131	28.1033
40	9.0688	10.2858		12.4166		14.9748		21.7250		31.4078	45.2610
45	11.9456	13.7648		17.0119		21.0029		31.9213		48.3245	72.8933
50	15.7356	18.4204		23.3078		29.4578		46.9030		74.3533	117.394
100	247.63	339.32		543.25		867.76		2199.89		5528.37	13781.6

A value of 1c. per ton is given to all coal yielding on combustion 12,500 B.t.u., and found at a depth of 500 ft. or less and having an average thickness of 6 ft. With this as a base a sliding scale is adopted to apply to almost any condition.

Later, corrections are made for factors such as distance from a railway, etc., not included in the formula. The equation used when combined is found below:

$$V = \left(\frac{MD - D}{MD - 500} \right) \times \frac{B.t.u.}{12,500} (4t + t^2)$$

certain rate per ton than to own the mineral outright. This is especially true where the coal is held some time before being mined out.

Referring to the Table of Coal Land Values, we find lands in southern Illinois worth from \$50 to \$200 per acre and lease rates from 2c. to 6c. per ton. If we adopt a value of \$100 per acre as an average we find that \$100 per acre with money worth 6 per cent. and taxes 2 1/2 per cent. amounts to \$495.72 at the end of twenty years at compound interest. Assuming a 6-ft.

bed, the royalty charge at the rate of 4c. per ton, 60 per cent. of the coal being mined, is about \$296.

It is evident that there is a period when the two values may be equal if other conditions are not considered. If only small areas are to be mined, and the time necessary to exhaust the territory is a few years, it will be found cheaper to purchase the coal outright; otherwise a lease proposition may be more advantageous to the operator. In general, we may say that long-term leases are more economical for many reasons. A lease may prove valuable to an operator as time passes and coal-land values increase.

At present there are more mines in operation than are required to produce the coal supply of the nation economically. These mines are capable of supplying the

rights today at \$100 per acre and was required to carry them 50 years, the price of coal to the consumer would be increased 30 to 35c. per ton.

It thus appears that the owner of small parcels of coal lands will, under the present conditions, be able to hold the title, pay less taxes and lease for a long term cheaper than the large investor. Values are bound to increase, for the supply of good coal is limited, but the operator may obtain a lease on coal property at a very low rate if certain provisions are made which appeal to the owner.

ADVANCE ROYALTY

For an example, suppose a farm is underlaid with a 6-ft. bed of good coal and that 6000 tons per acre could be mined and its value is placed at \$100 per acre. This would be 1 $\frac{2}{3}$ c. per ton for the available product. The time to reach the property in question is assumed to be 20 years. This deal could be closed by paying a royalty of 4c. per ton for all coal mined and an advance royalty

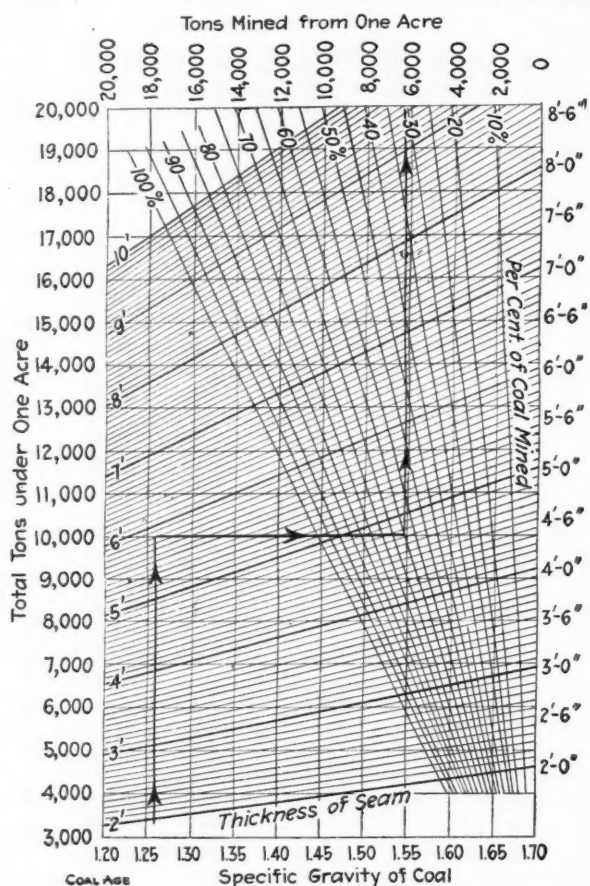


CHART GIVING TONS OF COAL OF ANY SPECIFIC GRAVITY AND THICKNESS OBTAINABLE FROM THE MINING OF ONE ACRE OF A LEVEL SEAM

Example marked by arrows: Given a coal of a specific gravity of 1.265 and 5 ft. 10 in. thick, the extraction being 60 per cent., the tonnage obtained will be 6040 tons per acre, and the total tonnage per acre will be 10,067 tons. The reader should start at the foot of this chart and follow the arrows as indicated.

need for some time. A vast area of undeveloped land is therefore doomed to be carried as a fixed charge upon the speculating operator or to be reserved by the original owner. Again referring to the Chart of Values, we find very little property valued at less than \$50 per acre. The greater part is estimated to be worth \$100 per acre. It is an absolute certainty that much of this land will be carried in trust for fifty years or more. From the interest table we find the amount of \$1 at 5 per cent. interest and 1 per cent. taxes for 50 years is \$18.42. Suppose then that an operating company bought coal

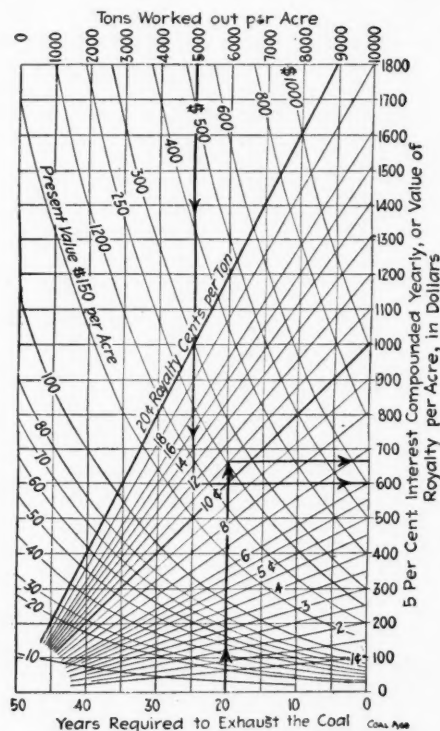


CHART CONNECTING ROYALTY AND PRESENT VALUE, BASED ON FIVE PER CENT. INTEREST AND ON VARYING ACRE-TONNAGES AND PERIODS OF EXHAUSTION

1. Suppose 5000 tons are mined from an acre at 12c. per ton, the royalty paid will be \$600 per acre. 2. Suppose a property costs \$250 per acre and is mined out immediately after 20 years have elapsed, such a property will have cost \$663.33 if the carrying charge for interest and taxes has been equivalent to 5 per cent. per annum compounded annually.

of \$3 per acre per year until mining operation begins, when the advance royalty would be deducted at the rate of 11 $\frac{1}{2}$ c. per ton mined. The lessor would also assume all taxes. Allowing five years additional for working out the coal, the account would be as follows:

Amount of \$3 annuity for 20 years less \$60 refund...	\$33.19
Royalty, 6000 tons at 4c.....	240.00
Interest on royalty payments when mining had begun at 5 per cent.....	18.92

Total cost leased coal..... \$292.11

When we compare this figure with the amount of \$100 at 6 per cent. interest and taxes compounded for 22 $\frac{1}{2}$

years, which is \$371.03, the advantage of the lease is marked. There are many other advantages which can be added to increase the balance in favor of leasing. The operator has less capital tied up and can employ more in producing coal economically.

Some of the risks incidental to a mining investment may thus be saddled upon the land owner and the public will receive its fuel at less cost. In case the operation proves unprofitable it may be abandoned with less loss to the public as well as the operator. Fewer mines would produce coal at a loss hoping for better conditions, as is now a common occurrence. In fact, the coal mining industry as it is now conducted is an economic crime.

LEASE SHOULD BE ADJUSTABLE TO RANGES IN MARKET PRICE OF COAL

The leases ordinarily made have no provisions for increase in values of coal and are thus advantageous to the producer. In order to provide a lease fair to both parties and also adjustable to changing conditions, the royalty rate should be a percentage of the difference between the face cost of the coal and the market price f.o.b. mines less 50 per cent., with a minimum fixed rate to protect the lessor.

The operator and lessor would thus share equally in the profit or loss, due to fluctuations in price and other conditions affecting the industry. It is easy to see the advantage of such a contract; it would compensate the operator for the increasing tendency of labor to obtain a greater share of the profit of the industry. It would also make the public an interested party in preparing a juster contract between the operators and labor. Public opinion would demand a fair return on the investment and hold the share of labor nearer its true value. The public as lessor could also compel equitable freight rates, with no discrimination against certain districts. In one state it is estimated that a differential of 10c. per ton between certain districts causes a difference in valuation of coal lands of from \$10 to \$50 per acre.

It may appear that the method of leasing previously suggested would force undue hardships upon the present operating land owner, but it hardly seems possible if the many advantages are considered. Little mining would be done at a loss in periods of uncertainty as at present: coal would be placed on the market at less cost and wasteful methods would not only be discouraged but eventually eliminated. As the valuable coal-bearing areas have been taken up in nearly all the Eastern fields, the percentage royalty plan would apply especially to the leasing of the state and government lands still waiting disposal.

PRESENT VALUATIONS ABOVE NORMAL

Summing up the situation, it seems that the current price of coal land is higher than, and out of proportion to, the prices of such natural resources as have to be secured in large quantities to provide for future operation. Since much of this land is being held by large interests to insure a supply when needed, the public will eventually pay the bill by paying more for its fuel. What the public should and will demand is economic, not radical, conservation. In the meantime, public sentiment should be brought to an understanding of the present conditions and induced not to express its disapproval by unfair laws and the imposition of confiscatory taxes.

Extracts from a Superintendent's Diary

We were honored today by a visit from J. Webb Smith, consulting engineer of national reputation.

Twelve years ago, this same J. Webb Smith was a division engineer of our company, residing in this camp. This is the first time we have seen him since he left.

During the twelve years that have elapsed, hardly a day has passed without someone expressing surprise at the kind of job J. Webb Smith was then holding. Ten years ago, they were wondering how he could be a chief engineer; eight years ago they were sure he could not hold down the job as General Superintendent, for long; six years ago, they were laughing at the idea of J. Webb Smith accepting a job as General Manager; four years ago, they predicted that when J. Webb Smith accepted the job of Managing Director of one of the largest coal corporations in the United States, he let his nerve get the best of his judgment; two years ago, when the announcement was made that J. Webb Smith had accepted an offer of something like \$25,000 a year, as consulting engineer, the prediction was made that J. Webb surely had hypnotized himself at last.

And now two years have passed and here comes J. Webb into our midst very much awake and still smiling.

It is a curious fact that men who are prone to stand still cannot realize that some of their neighbors are capable of developing. They always recall them just as they were ten or twenty years before, and when they learn that "Bill So and So" is doing this or that, they have only one remark to make—"Don't understand how he can get away with it."

Getting back to J. Webb Smith, I have reason to know that he was not only prepared for each advance that he received, but, in reality, was generally urged to take such promotions, before he consented to accept them.

He has the most wonderful capacity for absorbing knowledge and he works that capacity to the limit.

Knowing this, the day has been a very amusing one to me, because of the remarks most of the men have made after interviewing J. Webb.

We have an instrumentman on our corps today, who worked J. Webb as a chainman three weeks, at the beginning of his career. He only recalls that his pupil had a habit of talking with everyone and that when he went up in a miner's room with his tape, he always stopped to chat a while. I heard him tell one of his rodmen today, that so far as he could see, J. Webb hadn't changed any, and for the life of him, he couldn't see how a fellow who grins with every other word and says "Howdy" a thousand times a day, could be making such a stir in the world.

And so it went all down the line. Not one realized that in twelve years, a fellow can acquire an immense amount of knowledge if he is gifted with a certain determination, especially one who can meet every man, woman and child on common ground and is never ashamed to seek information of the humblest of human kind, if the aforesaid humblest happens to be possessed of information worth seeking.

J. Webb is such a one and withal, he isn't selfish in the least: He always gives value received for all of the hints dropped his way and the donor always goes away feeling that he has been the favored one.

Tanks for Coal-Mine Use

By F. W. WHITESIDE*

SYNOPSIS—Wooden tanks although somewhat cheaper in first cost than those built of steel, are ultimately more expensive. Flat-bottom steel tanks are satisfactory if placed directly on a foundation, but where a tower must be constructed a hemispherical, elliptical or conical bottom is preferable.

As steel has been displacing wooden construction in engineering and architectural work generally during the past decade, it is but a natural consequence that the "old oaken bucket" has been superseded by the galvanized-iron pail; the wooden barrel to a large extent, by the metal cask; and, in a marked, if perhaps a less degree, the wooden tank by one of steel.

Generally speaking, the railroads as a whole, represent a high type of efficient organization and management.

gan white pine, depending upon the price and quality of the lumber which is to be found upon the market in the locality where the manufactory is located.

Of the different woods employed, Michigan white pine has been the favorite, and more tanks have been constructed of this material than of any of the others. As the choicest grade of this timber has been cut, the mills are now working up the second growth, in many cases, so that the available supply of tank lumber of this material is far inferior to that of 10 years ago.

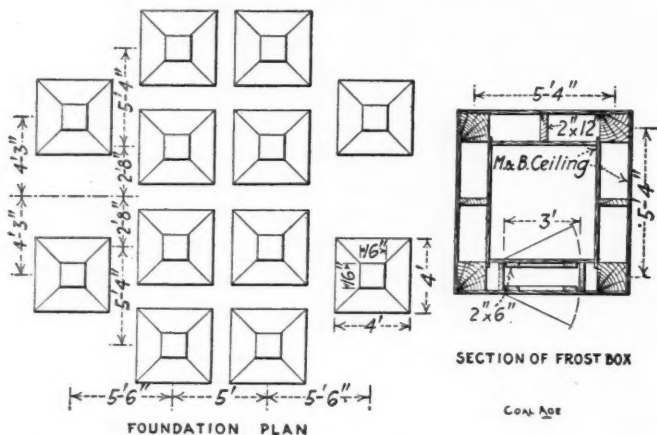


FIG. 1. FOUNDATION AND CROSS-SECTION OF FROST BOX FOR A WOODEN TANK

Their attitude regarding new ideas follows the thought conveyed in the old rhyme:

"Be not the first by whom the new are tried,
Nor yet the last to lay the old aside."

Wooden tanks, bridges, trestles, culverts, cars and equipment are gradually becoming but a memory, their places being filled by the modern structure of concrete and steel.

These changes are not made for the sake of beauty or experiment, but because it has been found that a dollar invested in concrete and steel has a greater earning power than one invested in wood.

Wooden tanks for water storage about the mines vary in size from a 50-gal. water barrel to the largest standard wooden tank made, which measures 30 ft. in diameter and 20 ft. in height, and stores 100,000 gallons. The size which has met with most popular favor has been the standard railroad tank, the dimensions of which are 24 ft. in diameter by 16 ft. in height, giving a capacity of 48,606 gal., although usually designated as a 50,000-gal. tank, for the sake of convenience; its weight loaded is 60 tons.

The wooden staves and bottom are constructed of California redwood, Oregon fir, Louisiana cypress, or Michi-

*Chief engineer, Victor-American Fuel Co., Denver, Colo.

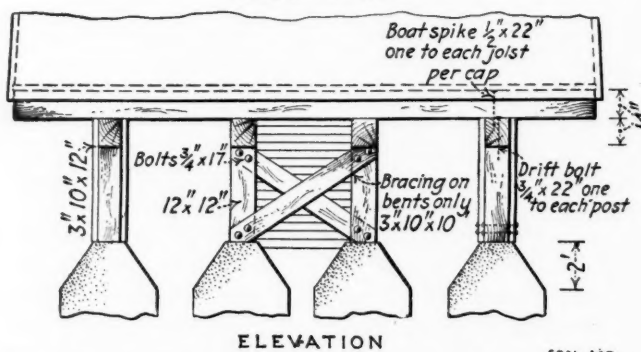
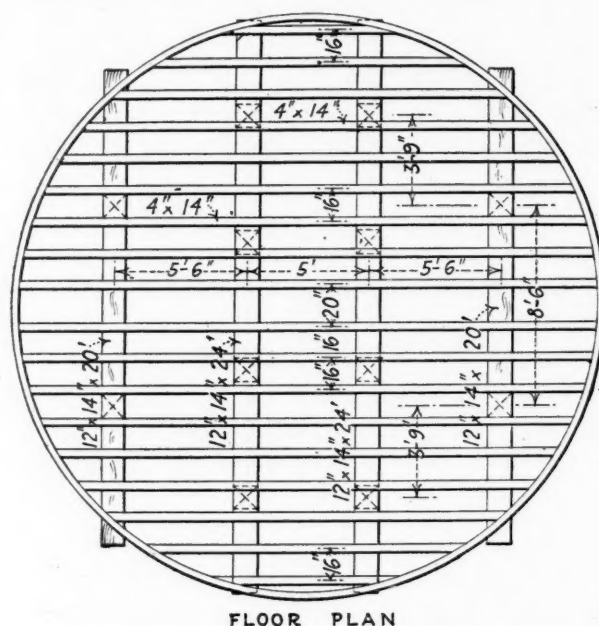


FIG. 2. FRAMEWORK SUPPORTING A WOODEN TANK

On account of its straight grain and freedom from knots, Oregon fir is meeting with considerable favor. California redwood abounds upon the Pacific Coast and is therefore used more frequently there than further east. Cypress is the best tank material on account of its structure, life and great durability, but its excessive cost—especially in the western part of the United States—prohibits its general use.

FLAT HOOPS ARE USUALLY EMPLOYED

The bands, or hoops, holding the staves in place are generally made of flat sheet steel from 4 to 6 in. in width, and of a thickness depending upon the pressure upon that portion of the tank where they are to be placed.

Owing to ignorance, or carelessness, upon the part of the erector, the hoops are oftentimes put in place and drawn tight without being painted upon the inside; he also neglects to paint the staves where they come in contact with these bands. After erection, the entire tank is painted upon the exterior, which protects the outside of the hoops from the weather, but fails to preserve their inner surfaces from the moisture coming from within the tank.

The exterior, including the hoops, is repainted every few years, but meanwhile the interior of the bands is rapidly being eaten away by corrosion, and what appears to be a sound steel band, is in reality but a strip of neatly painted rust. Finally the weakest hoop gives way and the entire tank collapses. With a failure of this nature the staves are usually broken into two or more pieces, the floor representing the entire salvage, although the writer has witnessed failures where the roof remained uninjured, and the staves which failed alternated with those which remained standing.

To obviate the difficulty of obtaining efficient painting and band protection, many tanks are now constructed with steel-band rods of circular cross-section, which permit of thorough painting and inspection, besides expos-

States, but will be somewhat less than this amount in the East. Of this figure the tank, indicator and roof represent approximately \$590 of the total expenditure.

OCCASIONALLY REMOVE A HOOP

It is a wise and inexpensive precaution to remove a band occasionally, giving it a thorough inspection, paying particular attention to the interior surface of the hoop, and to the lugs, bolts and rivets comprising the device for tightening the band when it is returned to place.

The most attractive feature of the wooden tank is its low first cost, when compared to that of steel, but the latter when properly designed, fabricated and erected by com-

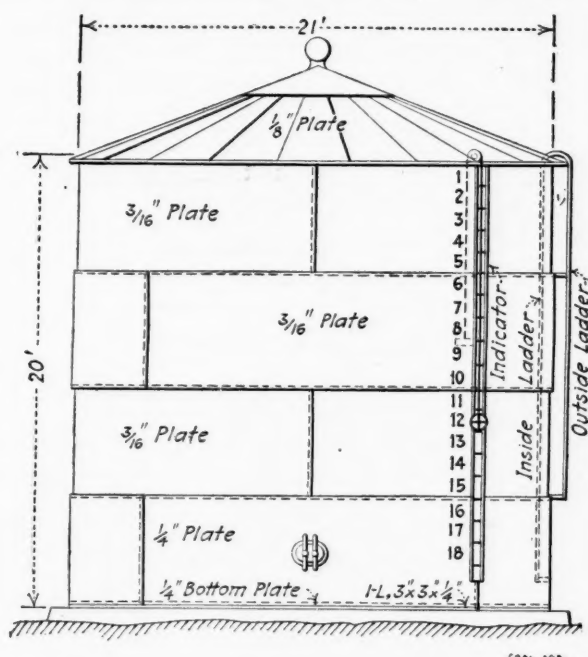


FIG. 3. A FLAT-BOTTOMED STEEL TANK

ing more stave surface to the painter. Failures of round-hoop tanks are exceedingly rare, and can usually be traced to other causes than hoop weakness.

On account of the great weight of the larger tanks when full of water, the foundations, posts and stringers carrying them need to be constructed upon substantial lines, hence, a considerable portion of the erection expense goes into framework and foundations.

Fig. 1 shows the piers and substructure of a typical 16x24-ft. tank, which is much employed for mine-water storage. The height of tank above piers is governed principally by the head required at points below, which receive their supply from the tank, especially in localities where the country lies so flat that a convenient hill for a tank site is not available. The cost of this installation complete is about \$1100 in the Western and Mountain

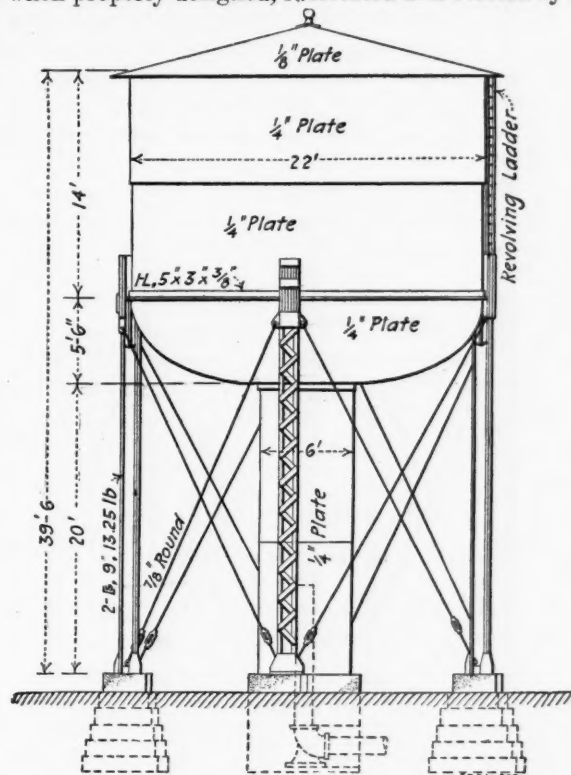


FIG. 4. AN ELLIPTICAL-BOTTOM STEEL TANK ON STEEL COLUMNS

petent workmen, possesses advantages which far surpass the one salient feature of the former.

A steel tank lasts indefinitely, whereas a wooden tank must be renewed in a comparatively short time. In this connection it should be remembered that the quality of material for wood tanks is constantly depreciating. The quality of steel can always be exactly specified, while that of wood is an unknown, variable quantity.

A steel tank remains absolutely watertight, irrespective of the varying heights of the liquid contained therein. A wooden tank shrinks and dries out unless kept constantly full, especially in the arid portions of the West.

A steel tank properly designed will not burst during the coldest winter weather. The same cannot be said of wood.

While service, rather than beauty, is the end toward which the mining engineer must strive, yet where beauty can be obtained without great additional cost, it is surely much to be desired. The more pleasing appearance of the steel tank is much in its favor, and in many localities is worthy of serious consideration on account of this fact alone.

In the transition from wood to metal construction, the first step was the substitution of a steel tower, or supporting columns, for the old wooden underframe. This, to a large extent, has been confined to installations already in place where the original wooden columns were beginning to fail, or where a greater head was required and it was necessary to raise the elevation, the tank itself being in a good state of preservation, and it was deemed best to continue with its use and carry it upon a steel structure.

While this is a step in the right direction, it does not represent a very decided advance, since, on account of the wooden floor of the tank, it is more difficult to support and requires carrying stringers placed much closer to-

pipe, as there are more rivet holes to leak and more surface to paint. But few are now built.

The engineers' attention has since been directed toward the tank of smaller dimensions and of greater elevation above the surface of the ground.

FLAT BOTTOMS ARE NOT ADVANTAGEOUS

One of the disadvantages of the flat-bottomed steel tank erected upon a high tower, was the weight of steel necessary to carry the flat floor of the tank. This is a dead load which the legs of the tower must support, and which has no other than its carrying value. To obviate this fault, the hemispherical bottom was designed, and its many advantages insured its immediate popularity, both with the engineering profession and the general public.

Following the hemispherical bottom, came that of elliptical shape, which offers several distinct advantages for certain classes of service. The tank itself is built of

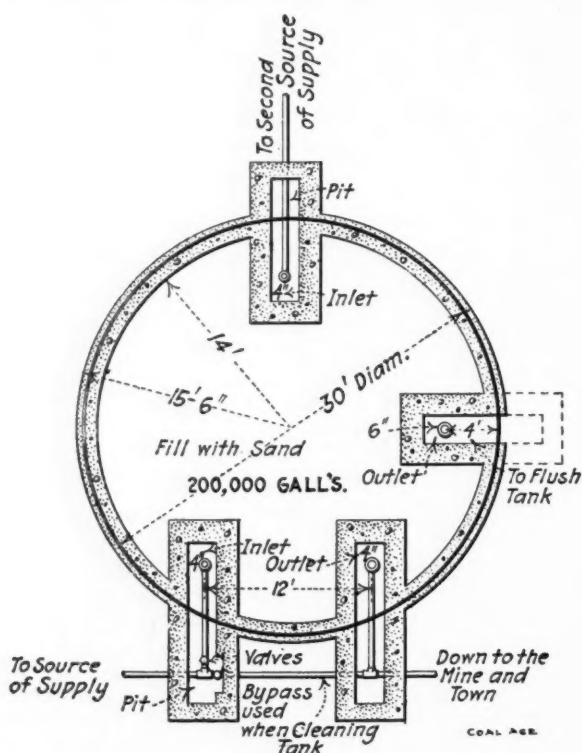


FIG. 5. FOUNDATION AND ARRANGEMENT OF PIPES WHEN TWO TANKS ARE USED

gether, than would be necessary with one constructed of flat steel sheets, or with a hemispherical bottom.

The average life of a wooden tank varies from 12 to 15 years of economical service, after which time, by continued patching, it may be made to hold together for an additional 10 years. But as these repair items are often of considerable magnitude it is a question at times whether or not it would be better to scrap the old tank and erect a new one.

The principal advantages which the steel tank presents over the wooden one is simplicity and economy of design, long life and low ultimate cost.

The standpipe, which as its name indicates, is a pipe standing upon end, supported directly by concrete or masonry, was in considerable public favor some ten or fifteen years ago. As it increased in height, the danger of failure was greatly augmented and the cost to maintain a given efficiency was greater than a steel tank of much less capacity standing upon steel columns to raise it the required height.

The cost of upkeep is greater in the case of the stand-

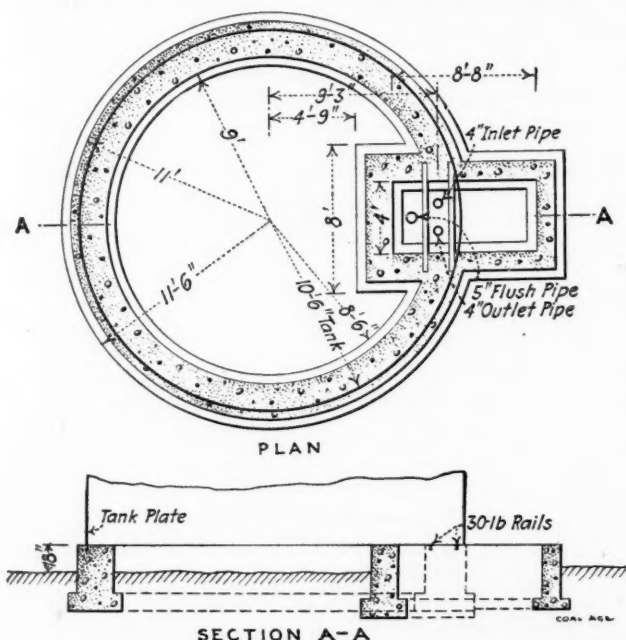


FIG. 6. PLAN AND SECTION OF SIMPLE FOUNDATION FOR A SINGLE STEEL TANK

larger diameter and more shallow depth, than the flat or hemispherical-bottom container of equal capacity.

One of the advantages notable is the large steel riser pipe with which it is possible to equip this design of tank. This riser is frost proof, and all mud and other sediment falls to its bottom, where it can be removed without interrupting the service of the tank.

A modification of the elliptical section is what is known as the conical-bottom tank. This is most generally used on low-elevation tanks in connection with the riveted steel riser pipe, which does away with the troublesome expansion joint, besides being frost proof and easily cleaned. The cost of a 50,000-gallon elliptical, spherical or conical-bottom tank, erected, is about \$2500, including concrete foundation. This will include a steel indicator and float, a steel roof, revolving ladder, blow-off valve, etc. The bottom of this tank is estimated 20 ft. above foundation. Where a hill of sufficient height to give the proper head is available, the flat-bottom tank possesses a number of advantages on account of its cheapness of erection.

Electricity in Coal Mining

BY DAVID R. SHEARER*

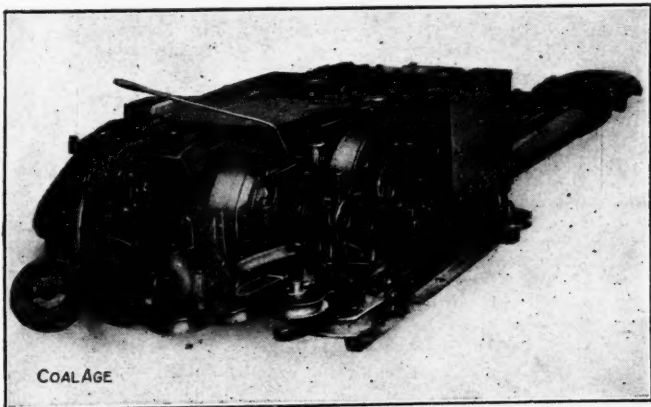
SYNOPSIS—This is the seventh article of the series on this subject. The three general types of coal-cutting machines—the punches, chain-breast and shortwall—are briefly described, as well as the kind of motors employed in the chain machines and the various methods of supplying the latter with current.

Many types of coal-cutting machines have been developed and placed in operation within the last few years. At first these were built of the pick type driven by compressed air in which the operation of the machine was much like that of pick work by hand, but since such machines must stand extremely hard usage and be subject to operation by unskilled labor, many changes have been made since the original devices were brought out.

Compressed air has been used with several kinds of coal-cutting machines, but has been replaced by electric power in the more highly developed types. Cutting machines are made in several forms for operating under different conditions upon various kinds of coal and are used in diverse methods of mining. The chief forms in use at the present time are the chain-breast machines, shortwall and under-cutting machines.

THE CHAIN-BREAST MACHINE

The chain-breast machine consists essentially of two parts, a rigid iron frame held in place on the floor by



REAR VIEW OF A GOODMAN FLAME-PROOF SHORTWALL MACHINE

jacks and second an endless cutter chain traveling over sprockets driven by an electric motor attached to the main frame. This motor serves the purpose both of running the cutter chain and of forcing the entire frame of the machine along the rigid guides upon which it runs. Attached to this endless chain are inserted steel bits, which cut a gash through the coal in the same manner that a saw cuts through wood. The depth and breadth of the cut may be varied as well as the speed of feeding.

The machine is operated by placing it on a truck and hauling to the location at which the cutting is to be done, where it is either pushed off from the truck or blocked in a working position. Some manufacturers use com-

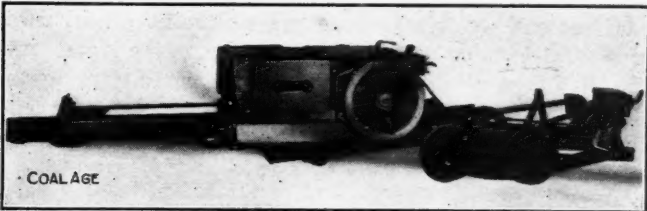
pound motors for general use on chain-breast machines, while others employ series motors.

The machines are made in several different sizes, cutting from 5 to 7 ft. in width at a rate of 7 to 40 in. per minute. Some recent improvements in breast machines consist in adding a self-propelling truck to the regular equipment, utilizing the motor which operates the machine to actuate the driving wheels. When the cutter is placed on the truck a temporary sprocket chain is used to connect the motor with the truck wheels, and in this manner the machine and truck may be propelled along the regular track to any part of the mine.

Electricity for operating the motors of cutting machines may be fed to them in various ways, the simplest method probably being the use of a duplex cable, which is wound up and unwound in a manner similar to that used on an electric gathering locomotive. Sometimes the truck, on which the mining machine is moved from place to place, carries a trolley pole from which current may be secured. Another method is by the use of a hand trolley, which is connected to the controller of the machine and is held in contact with the bare wire by one of the attendants. A machine of this type is shown herewith.

THE SHORTWALL MACHINE

Another cutter, which is used to a large extent, is the shortwall mining machine. This type of cutter is usually very rugged in design, comparatively simple in operation and rapid in work. The machine uses its own power for practically every operation necessary. It is moved from place to place by a self-propelled truck actuated by a temporary connection with the motor of the machine itself. Unloading is done by means of the feed rope or chain, which is fastened to a jack suitably placed,



A GOODMAN SHORTWALL MACHINE UNLOADING FROM TRUCK

so that the machine in winding up the rope drags itself off the truck and up to the face of the coal.

In cutting, the shortwall machine is drawn ahead by the feed rope and guided by the tail rope, the cutter arm entering the coal and the guard telescoping into the base of the machine. After sumping, the machine makes a cut across the face of the coal, mining to the full depth of the cutter. After a running cut is finished, the machine is dragged out from the coal, across the floor and back onto the truck by the use of the feed rope employed as in unloading.

These machines are very compact and may be operated even in places where props are necessary without inconvenience. The shortwall machine, as well as the chain-breast machine, cuts close to the floor, or in case a layer

*Knoxville, Tenn.

of clay is found beneath the coal, a cut may be made entirely under the seam. In some machines the feed control is varied by means of friction, while the motor is directly connected to the cutter-chain. The operating ropes namely the feed and tail ropes, are of flexible steel and are paid off a drum under adjustable control. The tail rope governs the cutter-arm position, while the feed rope pulls the cutter along through the coal.

The controller used on these machines is similar in construction to that used on mining locomotives and is usually of the drum type.

Where conditions are at all favorable, the use of mining machines or coal cutters will enormously increase the output if adequate facilities are at hand for removing the increased tonnage without creating a congested condition on the haulage tracks or at the shaft.

Alabama's Conservation

The figures of the U. S. Geological Survey show a large increase in the coke production of Alabama for 1913. The output increased from 2,975,489 short tons, valued at \$8,098,412 in 1912, to 3,323,664 tons, valued at \$9,627,170 in 1913. The gain in quantity was 348,175 tons, or 11.7 per cent., and in value \$1,528,758, or 18.9 per cent., according to figures compiled by E. W. Parker, in coöperation with the Alabama Geological Survey.

All of this increased production and more was in the output of retort oven or byproduct coke. There are in the state four retort-oven establishments, with a total of 700 ovens. In 1913 these produced 2,022,939 tons of coke, or a little more than 60 per cent. of the total output; whereas 22 active beehive plants with an aggregate of 4135 ovens in blast produced 1,300,750 tons, or less than 40 per cent. of the total. The average production per oven in the byproduct plant was 2890 tons; while in the beehive type it was 212 tons.

LARGE INCREASE IN OUTPUT OF BYPRODUCT COKE

The increase in the output of byproduct coke in 1913 over that of 1912 was 673,162 tons, or nearly double the total amount of increase, the value showing an advance of \$1,751,538 or \$232,780 more than the total increase. Moreover the average yield from the retort oven was 71.4 per cent.; whereas the average yield in the beehive oven was 64.5 per cent.

That the wasteful beehive oven has had its day in Alabama, and is on the decline, is evident by the fact that no new ovens of this type have been built in the last four years, and that 20 establishments with a total of 3447 ovens out of a total of 42 firms with 9584 ovens were idle during 1913, without counting the oven out of blast at plants that produce small amounts of coke. There were fewer beehive ovens in existence in Alabama in 1913 than in 1908, five years before.

The production of coke in Alabama in 1880, 1890, 1900, and annually from 1909 to 1913, is shown in the following table:

MANUFACTURE OF COKE IN ALABAMA, 1880-1913			
Year	Coke Produced (Short Tons)	Total Value of Coke at Ovens	Value of Coke at Ovens per Ton
1880.....	60,781	\$183,063	\$3.01
1890.....	1,072,942	2,589,447	2.41
1900.....	2,110,837	5,629,423	2.67
1909.....	3,085,824	8,068,267	2.61
1910.....	3,249,027	9,165,821	2.82
1911.....	2,761,521	7,593,594	2.75
1912.....	2,975,489	8,098,412	2.72
1913.....	3,323,664	9,627,170	2.90

Who's Who in Coal Mining

Down in Alabama there's a man by the name of Hamilton who is doing a lot of valuable engineering work in a quiet unostentatious sort of way. He is consulting mining engineer for the Tennessee Coal, Iron & R.R. Co., and the efficiency of the engineering department of this great Southern corporation is largely due to his conscientious, well directed efforts. All of his friends say that he is the kindest and most retiring man in the world.

Mr. Hamilton was born in Scotland in 1855, graduating from Anderson University in Glasgow. Upon finishing his college course, he accepted a position in the



ROBERT HAMILTON

office of a civil and mining engineer in Glasgow, and spent the next 11 years with this engineering firm.

He came to America in 1877, securing employment as a mining engineer for the bituminous mines of the Erie Railroad. He held this position five years, whereupon he accepted a place as superintendent of a mine in North Carolina, remaining at this work for only one year.

Mr. Hamilton then became affiliated with the Buffalo, Rochester & Pittsburgh Coal & Iron Co., occupying the position of mining engineer for the next seven years.

In 1902 he accepted a position as chief engineer of coal mines with the Tennessee Coal, Iron & R.R. Co., and has remained with the Tennessee company ever since.

Mr. Hamilton is generally credited with having installed the first successful electric haulage and mine-machine equipment in Alabama. This work was done at the No. 3 mine of the Tennessee company shortly after he located in Birmingham. He has been a pioneer in many advanced lines of engineering work, and is generally voted one of the most popular coal men in the south.

Agreement in the Pittsburgh District

SYNOPSIS—The agreement between the Pittsburgh district operators and the United Mine Workers of America, District No. 5, for the scale term, Apr. 1, 1914, to Mar. 31, 1916. The scale provides for the introduction of electric cap safety lamps and declares that monthly men, teamsters, electricians, stable bosses and engineers, shall not be under the jurisdiction of the scale.

The following agreement, made and entered into this first day of April, 1914, covering the prices and conditions of mining in western Pennsylvania for the two years ending Mar. 31, 1916: First, We agree to the general prices and conditions of the Cleveland agreement. Second, internal differences shall be referred to a joint conference of operators and miners of the Pittsburgh District for settlement.

PITTSBURGH OPERATORS' ASSOCIATION,
W. K. FIELD, President,
S. A. TAYLOR, Secretary,
GEO. W. SCHLUEDERBERG,
J. H. SANFORD.

DISTRICT 5, UNITED MINE WORKERS OF AMERICA,
VAN BITTNER, President,
ROBERT WOOD, Secretary.
Pittsburgh, Penn., Apr. 1, 1914.

MINING SCALE

PICK MINING

Thin vein, 1½-in. screened coal, per ton.....	\$1.00
Thin vein, mine-run, per ton.....	0.6464
Thick vein, 1½-in. screened coal, per ton.....	0.8680
Thick vein, mine-run, per ton.....	0.5611
All clay veins, 6 in. and less than 12 in.....	2.75
Anything over 12 in. in all places, at the rate per foot	2.75
When clay veins run at an angle there shall be paid	
in all places while it continues, per yard.....	0.68
Anything 6 in. or less shall be considered a spar, for	
which shall be paid in all places.....	1.37
When the spar runs at an angle there shall be paid	
additional, per yard, in all places.....	0.35
Room turning, neck not to exceed 7 yd.....	3.73
Entry, single shift, per yard.....	2.04
Entry, double shift, per yard.....	2.42
Entry, treble shift, per yard.....	2.80
For 12-ft. places, per yard.....	1.52
Breakthroughs between rooms, per yard.....	1.44
Breakthroughs between entries where slate is taken	
or comes down, and has to be removed, per yard....	2.04
Breakthroughs between entries where slate is not	
taken down, per yard.....	1.44
Cutting drains, per yard, in entries.....	0.16
Ripping roof, per yard, in entries.....	0.22
Pick sharpening on the dollar.....	0.01½
Ripping roof and cutting drain in any place to be	
paid at above price.....	
Crosscut entries, 45 degrees, extra, per yard.....	0.24

MACHINE MINING, USING HARRISON, INGERSOLL, OR SULLIVAN MACHINES

	Thin Vein 1½ in.	Thick Vein 1½ in.	Thin Vein Mine- Run	Thick Vein Mine- Run
Undercutting in rooms, per ton.....	\$0.1916	\$0.1550	\$0.1239	\$0.1002
Loading in rooms, per ton.....	0.5152	0.5590	0.330	0.2906
Drilling by hand and loading				
in rooms, per ton.....	0.5452	0.4830	0.3523	0.3121
Drilling by power and load-				
ing in rooms, per ton.....	0.5352	0.4750	0.3459	0.3070
Cutting in all narrow work,				
per ton.....	0.1949	0.1604	0.1260	0.1038
and 0.3029 per yard as				
yardage.....				
Drilling by hand and load-				
ing in entries, per ton.....	0.6624	0.5756	0.4281	0.3729
and 0.2650 per yard as				
yardage.....				
Drilling by power and load-				
ing in entries, per ton.....	0.6542	0.5628	0.4228	0.3633
and 0.2650 per yard as				
yardage.....				
Loading in entries, per ton..	0.6310	0.5516	0.4078	0.3565
and 0.2650 per yard as				
yardage.....				
Loading and hand drilling				
in breakthroughs between				
entries, to be at entry price.				

Loading in breakthroughs be-				
tween rooms, per ton.....	0.5860	0.5156	0.3787	0.3332
Loading and hand drilling				
in breakthroughs between				
rooms, per ton.....	0.6160	0.5396	0.3981	0.3487
Drilling by power drill, per				
ton.....	0.02	0.0160	0.0130	0.0100
Drilling by hand drill, per ton	0.03	0.0240	0.0200	0.0160
For loading and cutting in room turning, entry price shall				
be paid.				

Wherever narrow work prices are mentioned on all machine cutting and loading their equivalent may be paid in yardage by mutual agreement.
Pick sharpening, loading after machines, 0.0075 on the dollar; both thick and thin vein.
Loaders to receive 12c. per yard in addition to above prices when driving entries double shift.

MACHINE MINING, USING JEFFREY, LINK-BELT, MORGAN-GARDNER, OR ANY OTHER CHAIN MACHINE

	Thin Vein 1½ in.	Thick Vein 1½ in.	Thin Vein Mine- Run	Thick Vein Mine- Run
Undercutting in rooms, per				
ton.....	\$0.1244	\$0.1019	\$0.0805	\$0.0659
Loading in rooms, per ton...	\$0.5356	0.4761	0.3462	0.3077
Drilling by hand and loading				
in rooms, per ton.....	0.5656	0.5001	0.3656	0.3233
Drilling by power and load-				
ing in rooms, per ton.....	0.5556	0.4841	0.3591	0.3129
Cutting in all narrow work,				
per ton.....	0.1644	0.1345	0.1063	0.0873
Drilling by hand and loading				
in entries, per ton.....	0.6831	0.5928	0.4415	0.3828
and 0.3200 per yard as				
yardage.....				
Drilling by power and load-				
ing in entries, per ton.....	0.6737	0.5768	0.4361	0.3734
and 0.3200 per yard as				
yardage.....				
Loading in entries, per ton..	0.6537	0.5688	0.4225	0.3671
and 0.3200 per yard as				
yardage.....				
Loading and hand drilling in				
breakthroughs between en-				
tries, entry price to be paid.				
Loading in breakthroughs be-				
tween rooms, per ton.....	0.6064	0.5327	0.3929	0.3452
Loading and hand drilling				
in breakthroughs between				
rooms, per ton.....	0.6474	0.5656	0.4185	0.3656
Drilling by power drill, per				
ton.....	0.02	0.0160	0.0130	0.0100
Drilling by hand drill, per ton	0.03	0.0240	0.0200	0.0160
For loading and cutting in room turning, entry price shall				
be paid.				
Wherever narrow work prices are mentioned, on all ma-				
chine cutting and loading, its equivalent may be paid in yard-				
age by mutual agreement.				
Pick sharpening, loading after machines, 0.0075 on dollar,				
thick and thin veins.				
Loader to receive 12c. per yard in addition to above price				
when driving entries double shift.				

MACHINE DEAD WORK. THICK AND THIN VEIN

WITH HARRISON, INGERSOLL, OR SULLIVAN MACHINES	
Clay veins 6 in. and less than 12 in.....	\$2.02
of which the cutter receives 51c. and the loader \$1.51.	
Anything 12 in. or over, at the rate per foot of.....	2.02
of which the cutter receives 51c. and the loader \$1.51.	
When clay veins run at an angle across the room there	
shall be paid while they continue, per yard.....	0.49
of which the cutter receives 11c. and the loader 38c.	
Anything 6 in. or less shall be considered a spar, for	
which shall be paid.....	1.00
of which the cutter receives 24c. and the loader 76c.	
When the spar runs at an angle there shall be paid ad-	
ditional, per yard.....	0.26
of which the cutter receives 7c. and the loader 19c.	

WITH JEFFREY, LINK-BELT, MORGAN-GARDNER OR ANY OTHER CHAIN MACHINE

Clay veins 6 in. and less than 12 in.....	\$1.85
of which the cutter receives 32c. and the loader \$1.53.	
Anything 12 in. or over, per foot.....	1.85
of which the cutter receives 32c. and the loader \$1.53.	
When clay veins run at an angle across the room there	
shall be paid while they continue, per yard.....	0.44
of which the cutter receives 7c. and the loaders 37c.	
Anything 6 in. or less shall be considered a spar, for	
which shall be paid.....	0.91
of which the cutter receives 17c. and the loader 74c.	
When the spar runs at an angle there shall be paid ad-	
ditional, per yard.....	0.22
of which the cutter receives 5c. and the loader 17c.	
All prices for narrow work and dead work in the thin vein	
shall apply for similar work in the thick vein.	

AIR MACHINES, EQUIVALENT PLAN IN THIN VEIN

Cutter, entry price.....	\$0.1949
Cutter, room price.....	0.1916
Tons to 1 yd. of entry.....	\$0.0033
	3
	\$0.0099

Entry yardage added.....	0.3029
Total cost of cutting 1 yd. of entry.....	\$0.3128
Loader, entry price.....	\$0.6624
Loader, room price.....	0.5452
Tons to 1 yd. of entry.....	3
Entry yardage added.....	\$0.3516
Total cost of loading 1 yd. of entry.....	\$0.6166

ROOM TURNING

Cutter, 13 yd. at \$0.3128.....	\$4.07
Loader, 13 yd. at \$0.6166.....	8.02

AIR MACHINES, THICK VEIN, EQUIVALENT PLAN

Cutter, entry price.....	\$0.1604
Cutter, room price.....	0.1550
Tons to 1 yd. of entry.....	\$0.0054
Entry yardage added.....	4 1/4
Total cost of cutting 1 yd. of entry.....	\$0.0229
Loader, entry price.....	0.3029
Loader, room price.....	0.4830
Tons to 1 yd. of entry.....	4 1/4
Entry yardage added.....	\$0.3936
Total cost of loading 1 yd. of entry.....	0.2650

ROOM TURNING

Cutters, 13 yd. at \$0.3258.....	\$4.24
Loader, 13 yd. at \$0.6586.....	8.56
ELECTRIC MACHINES, THIN VEIN, EQUIVALENT PLAN	
Cutter, entry price.....	\$0.1644
Cutter, room price.....	0.1244
Tons to 1 yd. of entry.....	\$0.0400
Entry yardage added.....	3
Total cost of cutting 1 yd. of entry.....	\$0.1200
Loader, entry price.....	0.0250
Loader, room price.....	0.4830
Tons to 1 yd. of entry.....	4 1/4
Entry yardage added.....	\$0.3936
Total cost of loading 1 yd. of entry.....	0.2650

ROOM TURNING

Cutters, 13 yd. at \$0.3258.....	\$4.24
Loader, 13 yd. at \$0.6586.....	8.56
ELECTRIC MACHINES, THIN VEIN, EQUIVALENT PLAN	
Cutter, entry price.....	\$0.1644
Cutter, room price.....	0.1244
Tons to 1 yd. of entry.....	\$0.0400
Entry yardage added.....	3
Total cost of cutting 1 yd. of entry.....	\$0.1200
Loader, entry price.....	0.0250
Loader, room price.....	0.4830
Tons to 1 yd. of entry.....	4 1/4
Entry yardage added.....	\$0.3936
Total cost of loading 1 yd. of entry.....	0.2650

ROOM TURNING

Cutter, 13 yd. at \$0.1450.....	\$1.89
Loader, 13 yd. at \$0.6725.....	8.74
ELECTRIC MACHINES, THICK VEIN, EQUIVALENT PLAN	
Cutter, entry price.....	\$0.1345
Cutter, room price.....	0.1019
Tons to 1 yd. of entry.....	\$0.0326
Entry yardage added.....	4 1/4
Total cost of cutting 1 yd. of entry.....	\$0.1386
Loader, entry price.....	0.0318
Loader, room price.....	0.5928
Tons to 1 yd. of entry.....	4 1/4
Entry yardage added.....	\$0.1704
Total cost of loading 1 yd. of entry.....	0.0927

ROOM TURNING

Cutter, 13 yd. at \$0.1704.....	\$2.22
Loader, 13 yd. at \$0.7140.....	9.28
ELECTRIC MACHINES, THICK VEIN, EQUIVALENT PLAN	
Cutter, entry price.....	\$0.1345
Cutter, room price.....	0.1019
Tons to 1 yd. of entry.....	\$0.0326
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Firemen shall work 8 hours and receive the same wages per day as they are now being paid.

Wages now paid for other outside labor to remain as they are. The men now on the above day jobs receiving more than the scale names, are not to be reduced.

It is understood that monthly men, teamsters, electricians, stable boss and engineers are not under the jurisdiction of this scale.

It is understood that the mine committee shall not interfere with outside men, but if outside men have a grievance under the contract it shall be taken up directly with the district officers of the United Mine Workers of America and the representatives of the coal company.

NEW OR PERMISSIBLE EXPLOSIVES

Coal mined with new or permissible explosives shall be paid for on a mine-run basis, or on a 1 1/4-in. basis by paying 5 1/2 per cent. advance on coal mined in rooms and 9 per cent. advance on coal mined in entries over price established in their respective districts.

At all mines where new or permissible explosives are used the company shall furnish them to the miner at the same cost per ton of coal produced as black powder.

STUMPS AND PILLARS

Machine men and loaders will not be required to cut and load coal in pillars and stumps where it is impracticable and unsafe. Where pillars and stumps are cut and loaded by machines all dead work performed in connection therewith shall be paid for at the prevailing rate of \$2.84 per day; clay veins, spars, etc., to be paid for at prevailing scale rate; all tracks are to be laid by the operator.

It is agreed that ribs and stumps shall be cut with short-wall machines with the understanding that the operator shall have the option of using any type of machine in all other places.

RULES

Hours of Labor—1. The hours of labor at the mines to be from 7 o'clock a.m. until 12 o'clock noon, with one full hour for dinner, and from 1 o'clock p.m. until 4 o'clock p.m.

Thick Slate—2. All thick slate over 12 in. to be paid for at the rate of 5.25c. per inch per linear yard, slate to be measured in the thickest portion. For horsebacks and rolls miner will be paid at the rate of 35 1/2c. per hour, or \$2.84 for eight hours. When it becomes necessary for a miner to unload slate he must be paid 35 1/2c. per hour, or \$2.84 for an eight-hour day.

Four-Run Places—3. Yardage price for places of four runs with 42-in. cutter-head machine to be placed on the scale at three-fourths entry price. This is not to apply to room turning.

Allowance for Clay Veins—4. Allowance for clay veins shall be in proportion to the thickness, present price to apply to 1 ft. or less.

Removing Slate in Breakthroughs—5. Where slate comes down, or is to be taken down in breakthroughs between rooms and has to be removed by loader, entry price shall be paid.

When Rooms are Narrowed Down—6. Where the mine foreman narrows a room down 12 ft. or less in going through a clay vein or spar, narrow work prices shall be paid.

Miner Leaving Face to Perform Other Labor—7. Where the miner is required by the mine foreman to leave his work at the face to perform other labor he shall be paid at the rate of \$2.84 per day. Where a miner has no work at the face and is given other labor he shall be paid the scale rates for such labor.

Room Turning—8. In turning rooms it is understood that the present equivalent plan in the scale is based on 21 ft. of stump and room 21 ft. wide, additional payment is to be made for thicker stumps in the same proportion; also, that where pick work has to be done in room turning to allow machine to cut, pick prices will be paid, except where only pick work is done to allow machine to turn, when the present practice at the various mines is to continue.

Wet Entries—9. Price for wet entries to be agreed upon between the mine boss and miners.

Number of Places—10. Two loaders shall have two rooms and work together in one room until same is cleaned up so as not to interfere with or delay cutters. This does not apply to ribs, stumps, pillars or entries.

Turn—11. An equal turn shall be kept as far as practicable. This must not interfere with development or necessary work.

Cleaning Stock—12. Drivers will not be required to clean the company's stock.

Safety Lamps—13. Electric cap lamps shall be substituted for locked safety lamps at a charge to the user of 3c. per shift per lamp. A safety lamp, where required by the cutter to comply with the mining law, will be furnished him free.

Where the electric cap lamp is substituted voluntarily on part of the operator for an open lamp a charge of 3c. per shift per lamp shall be made.

House Rent and Coal—14. House rent and house coal to be the same as under the contract which expired Mar. 31, 1914.

Collections for Checkweighman—15. The wages of checkweighman will be collected through the pay office semi-monthly, upon a statement of time made by the checkweighman. The amount so collected shall be deducted on a percentage basis, agreed upon by the checkweighman and clerk, from the earnings of the miners engaged in mining coal and shall be sufficient only to pay the wages and legitimate expenses incident to the office. The pay statement shall be signed by the checkweighman and his wages can be drawn from the office by representatives of the miners. Deductions for the checkweighman's wages are to be given precedence over all others.

Check-Off—16. Check-off for the United Mine Workers to remain in force and our agreement on deductions for the organization to read as follows: Operators will make collections for the miners' dues of 50c. per month, with an addition of 1/2 per cent. of the gross earnings, which shall be collected when so requested by the United Mine Workers. Special assessments for international organization to be deducted as requested by the officials of said organization. Initiation fees

to be taken off not to exceed \$1 per man in any one pay; the check-off to apply to employees in and around the mine.

Notice of such collections to be given at the mine on the 1st and 16th day of each month for the succeeding pay.

Collection for the union shall follow checkweighman, accident and death benefits, rent and smithing.

Duties of Mine Committee and Manner of Adjusting Grievances—17. Grievances shall be taken up between the employee affected and the mine boss for adjustment. In case they fail to settle the same any grievance shall be referred to the mine committee and the superintendent, and if they fail the grievance shall be referred to the miners' officials and the company officials, the mine to continue in operation pending a settlement.

When a grievance of the inside men is referred to the mine committee and it becomes necessary for them to meet the mine boss or superintendent, it shall be at a fixed time and after working hours of the mine.

Deaths and Funerals—18. When death by accident occurs in a mine, for that day only the miners may cease work, but under no circumstances shall a mine be laid idle for a funeral. This is, however, not to prevent individuals from attending a funeral.

Change in Basis—19. Two days' notice shall be given to miners when change is to be made from the run-of-mine to screen coal.

No mine to go on a run-of-mine basis unless mutually agreed to by operator and miners.

Other Conditions—20. The prices and provisions of the general contract shall apply to all mines operating in what is now known as the Pittsburgh district, operated by companies which are parties to this agreement.

21. All other conditions not specified by this contract to continue as under the agreement which expired Mar. 31, 1914.

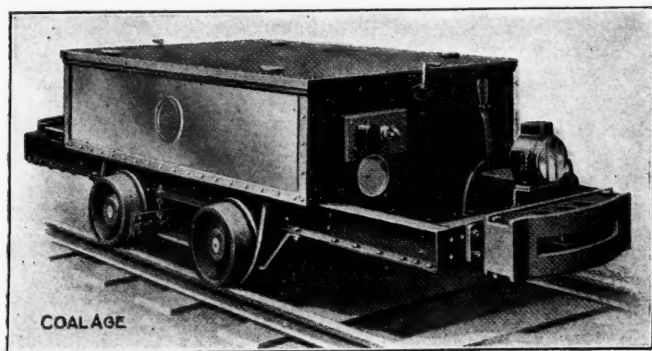
Signed on behalf of the Pittsburgh Operators' Association:

W. K. FIELD, Pres.,
S. A. TAYLOR, Secy.,
GEO. W. SCHLUEDERBERG,
J. H. SANFORD.
On behalf of miners:
VAN BITTNER,
F. P. HANAWAY,
ROBERT WOOD,
JAS. FLOOD,
JAS. CHARLTON,
WM. HARGEST,
JOHN O'LEARY,
SIDNEY DAVIS,
WM. TEARE.

A New Storage Battery Locomotive

Although the storage battery mining locomotive has been in use for some time, many people are unfamiliar with its characteristics and possibilities. One small machine of this type may readily be made to do the gathering for which several mules and as many drivers would ordinarily be required.

With the storage battery type of mine tractor rail bonds, third rails, trolley wires or other forms of current



GATHERING LOCOMOTIVE OF STORAGE-BATTERY TYPE

conductors along the track or of which the track forms a part are obviously unnecessary. At night the machine is merely run to a place where connection with a current supply from outside the mine may be secured. Proper connections with the source of energy are here made and the machine allowed to charge over night. By morning the battery has become fully charged and is capable of delivering the maximum current required by the motor throughout the entire day.

The Atlas Car & Manufacturing Co., of Cleveland, Ohio, has recently placed upon the market a new line of storage battery locomotives. These combine the simplicity and reliability of the automobile motor with the durability and ruggedness of the armor plate, trolley type of mine tractor so well and favorably known throughout the country.

The body is built up of steel plates, the entire top being removable, affording ready access to the cradle-hung motors and the storage batteries, which may be of any standard make desired. Cast-iron wheels with chilled and ground treads are employed, and ample sand boxes provide for sanding all drivers when moving in either direction.

These locomotives are built in sizes varying from 2 to 5 tons. Standard track gauges range from 36 in. to 48 in., but may be varied to suit conditions. All of the machines are low, the maximum height above the rail being 3 ft. 6 in.

The cost of mine haulage with storage battery locomotives is low. Gathering, for instance, where the distance traversed averages not over 1000 ft., may be done at a cost approximating 1½ cents per ton of coal hauled.

The Man Who Dug

The village folks for many years had treated Old Pop Jenks with jeers and laughed to scorn the simple way he spent his working hours each day. For Pop laid claim to wealth galore, hid, so he said, along the shore where Captain Kidd and comrades bold secreted their ill-gotten gold. And Pop was strong in his belief that he alone knew where the Chief of that historic robber crew had left the wealth of those he slew. So while his neighbors, fat and smug, looked on and sneered, old Pop just dug! From early morn till sunset's rest old Pop pursued his toilsome quest and shoveled holes in Mother Earth while all the village shook with mirth. The land around old Pop Jenk's home was not unlike a honeycomb, and one would think some giant moles had lived where Pop had dug his holes. From spot to spot he moved his kit and dug the ground up bit by bit; unfaltering courage marked his toil nor disappointments served to foil nor turn him from his self-set goal—and folks looked on and said, "Poor Soul." But one day through the vales and hills a rumor spread that started thrills to agitate the minds of folk who called Pop Jenks a grizzled joke. From lip to lip the story flew, men asked each other if 'twere true, if old man Jenks had really found the wealth he claimed was underground. Then everyone began to race along the road to Old Pop's place, where resting in triumphant joy midst wealth he'd dreamed of since a boy, the old man stood with out-thrown chest—a leader, now, no more a jest! And folks who'd sneered at Old Pop's name, now shook his hand, proclaimed his fame.

'Tis thus with all ambitious dreams; the world heaps ridicule on schemes that soar beyond its narrow ken, and sometimes martyrs noble men. But those with strength of mind and heart to grimly play their chosen part, oft write their names in letters big, because like Old Pop Jenks, they dig!

—From "No-Rim-Cut News," house organ of the Goodyear Tire & Rubber Co., Akron, Ohio.

The Chemical Laboratory in Coal Mining Work

By R. E. RIGHTMIRE*

SYNOPSIS—Because of the fact that the coal consumer is becoming more exacting in his coal-purchase specifications, the operator of mines has found it absolutely necessary to keep informed as to the character and quality of his coals. One coal laboratory made 50,000 analyses in a year. Some consumers believe heating value (B.t.u.) is the true measure of quality. The laboratory in safety work.

The chemical laboratory is today an important factor in coal-mining work. This situation has not resulted from any forethought or natural desire on the part of the operator, to know more about his coal but has been forced upon him by the coal consumer.

There was a time not long ago, when no distinctions were made and the most available coal was used, regardless of conditions to be met.

In the change from charcoal to coal as a fuel for smelting processes, many difficulties were encountered and the ironmaker was the first to discover that all coals did not give him equally satisfactory results, and the selection of coals for certain purposes dates from this period.

As a result of careful observation, splint coal was selected as a satisfactory substitute for charcoal, not on account of information as to its purity, but because it is free-burning and can be secured in large lumps, which retain their form during burning, with considerable strength for burden bearing.

Afterwards it was discovered that some coals agglomerated or coked before burning to ash and this coke, because it would bear a greater burden of capacity in the blast furnace than splint coal, was selected as the more desirable fuel.

Before chemistry was employed in iron-making it was known that sulphur had a detrimental effect on iron, and after the employment of chemistry, it was found that phosphorus also was undesirable in iron making.

COAL OPERATOR WAS FORCED TO CALL CHEMISTRY TO HIS AID

In his efforts to avoid these troublesome elements to the greatest extent, the furnaceman demanded of the coke maker that furnace coke should contain sulphur and phosphorus not in excess of certain limits. This forced the coal operator to call chemistry to his aid that he might know and control the quality of his product, and the chemical laboratory has necessarily been associated with intelligent operation of coal mines since that time.

The laboratory plays an important part in the selection of a coal area for operating purposes, through the information it supplies as to the character and quality of coal shown by samples taken, for field sampling, properly directed, reveals the average quality of coal which the particular area may be expected to furnish.

In an up-to-date mine operation, it is essential to know the quality of coal from top to bottom of seam and

this can be determined only by analysis of samples representing different parts of the seam section.

The proper interpretation of such analyses indicates the mining method that should be adopted to eliminate objectionable impurities, in order that coal of the desired quality may be shipped.

Mine samples should be taken regularly in the advancing working places in the mine—the analyses showing the tendency of the seam with respect to quality, thus furnishing the information necessary for proper direction of mining operations as well as application of the coal commercially.

The value of analyses in mine operation is not in the actual results obtained, but depends wholly upon their proper interpretation.

CHEMICAL LABORATORY AND ITS RELATION TO SAFETY

In efforts to secure the greatest safety in mine operation, the laboratory has also been called upon in recent years to sample and analyze mine air and the information thus obtained is used in the regulation and control of mine ventilation, so that dangers arising due to the presence of gases in the mine may be minimized to the greatest extent.

The coal-testing laboratory, in addition to giving information essential to proper mine operation, is of great aid in marketing the coal to the best advantage.

The illuminating-gas manufacturer requires low-sulphur coal; byproduct plants require not only coal low in sulphur, but the phosphorus also must be kept within certain limits, if the coke is to be used for metallurgical purposes; the steel manufacturer requires low-sulphur coal for producer gas. It is apparent, therefore, that the coal operator must know the chemical character of his coals, if shipments are to meet satisfactorily the requirements of such business, and he is able to do so only by the aid of the chemical laboratory.

In the last few years, much coal for steam purposes has been bought on specifications. Heating value is nearly always a prominent feature of such contracts, results of proximate analysis being a feature in all.

LABORATORY HAD TO ADD CALORIMETRY TO ITS ANALYTICAL WORK

The contention that heating value or B.t.u. is the true measure of quality, or value of coal for steam or heating purposes, has enlisted considerable support and made it necessary for the coal laboratory to add calorimetry to its analytical work, that such information may also be available in the selection of coal to meet contract requirements.

This contention has frequently been proven to be incorrect in practice, coals of comparatively low B.t.u. showing higher efficiency than those of higher B.t.u., and the explanation for this has been found by laboratory investigation to be due to a difference in the character of the ash, this from an interpretation of the ash analyses.

The operation of a coal-company laboratory varies ac-

*Engineer of tests, Consolidation Coal Co., Fairmont, W. Va.

according to the amount of work to be handled. In a laboratory with which we are familiar, the work is done by six men.

DETAILS OF LABORATORY WORK

It is the duty of one man to properly prepare all samples received at the crushing or sampling laboratory, before they are sent to the chemical laboratory. The sample received at the sampling laboratory usually weighs about five pounds and this is reduced by crushing, mixing and quartering to about four ounces, which is tightly sealed and sent to the chemical laboratory, where it is given a laboratory number. This number, along with a description of the sample, is entered on the records.

The analysis most frequently made—proximate analysis—consists in determining the percentages of moisture, volatile matter, fixed carbon, ash and sulphur.

The ultimate analysis, which is more difficult to make and not so frequently required, shows the proportion in which the different constituents are found in the coal.

Determination of heating value or B.t.u. is also included in the work of the chemical laboratory, and reliability of results obtained depends upon the care and skill with which the calorimeter is operated. In this connection it should be noted that the oxygen bomb calorimeter only is commonly regarded as the standard instrument for such determinations.

Ash analyses and nitrogen determinations, though not so frequently desired as the information mentioned above, can be taken care of readily by the laboratory, as well as analyses of various materials used in connection with mine operation.

In the ten years of its existence, the Consolidation Coal Co.'s laboratory has made approximately 50,000 analyses; each year showing an increase over the preceding one in the amount of work done.

We have stated briefly the principal features which have made the chemical laboratory a necessity in coal-mining work during the past 15 or 20 years. The need of information on coal, which can be supplied only by the laboratory, has become more urgent each year. The increasing demand in this respect is evidenced by the demand for coal of better quality than that previously used for certain lines of manufacture, the explanation being given that the manufactured product was compelled to meet more strict specifications than formerly.

The coal consumer apparently is becoming more firmly convinced that his interests are best served by requiring of the coal operator a product which will meet more exacting specifications. These conditions require the operator to be well informed as to the character and quality of his coals, and this can be accomplished only through the work of the chemical laboratory.

The present indications are that the chemical laboratory will be called upon to assume still greater responsibility in the solution of problems connected with coal mining, and regardless of views entertained by the coal operator concerning it, the laboratory is here to stay.

Automatic Reclosing Circuit-Breaker

An automatic circuit-controller has recently been developed by the Automatic Reclosing Circuit Breaker Co., of Columbus, Ohio. This consists of an electromagnetically operated circuit-breaker, so arranged that in case

of overload or short-circuit the breaker opens the line. In addition to opening the circuit, however, this breaker automatically recloses it as soon as the overload condition or short-circuit is removed.

This breaker is especially adapted for use in small substations for mines or electric railways, since by its use no attendant is required in the station except to start and stop the generator or rotary converter or for occasional inspection.

The main contact arm of this breaker is normally held in the closed position by means of an electromagnet. When an overload occurs the current in the series coil raises a plunger, which opens a contact in the circuit of the operation magnet, thus cutting off the current and allowing the main contact to open the load circuit. A high resistance is connected in shunt to the main contact and a small current will now flow through this to act as an index to the condition of the line.

After the opening of the main breaker a dash pot allows a contact to close a circuit connecting a low-resistance trip coil in parallel with the load circuit and in series with the high resistance. The index current which flows through the high resistance now has two paths, it can either traverse the short-circuit or the trip coil. The index current will flow through the short-circuit as long as it exists, but after it is removed it will then be forced through the trip coil, which releases a latch and allows the magnet to be energized again, closing the circuit.

Coke Production in Kentucky

Coke is manufactured in Kentucky from coal mined in both the eastern and western fields of the state, but although the coals of the eastern counties are in large part among the high-grade coking fuels of the Appalachian field, most of the coke, until the last two years, has been made in the western district.

Since the recent extensive coal-mining development in the Elkhorn district of Pike and Harlan Counties, however, coke ovens have been built and coking activity has shifted to the eastern sections of the state, and Kentucky is now assuming some importance in the coke-manufacturing industry.

The production has increased from less than 50,000 tons in 1909, to 317,084 tons in 1913.



THE STEAM SHOVEL THAT REMOVES THE DEBRIS AND DIRT FROM THE WORKING BASIS

The Labor Situation

SYNOPSIS—Southern Ohio mines will soon resume. Rioting and destitution affect eastern Ohio with no approach to a settlement. No agreement has been reached in Oklahoma. The trial of District President, P. R. Stewart in Arkansas is a source of no little excitement.

The main interest of the labor situation has recently shifted to Ohio. No further progress is now being made there or elsewhere in reaching a settlement, but in that state there has been much prospect of violence and some of the men who group themselves with the U. M. W. of A. are breaking the law in a manner approximating that of the I. W. W., though under the aegis of the American flag.

INTIMIDATION OF PUMPERS AND ENGINEERS

Despite the ruling of the Union, the strikers are endeavoring to stop the pumping of water and the ventilating of the mines, and where they have been unsuccessful, they have threatened to wreck the properties. On July 7, they marched on Mines Nos. 1, 2 and 6 of the Rail & River Coal Co. and on the Bakewell and Poultny mines, all of which are near Bellaire, in Belmont County. They succeeded at these places in calling out the engineers, pumpmen and firemen. The next day they marched to Webb, Fort Pitt, Johnson and Big Run mines, which are to the south and west of Bellaire. They induced the men of those mines to quit work.

John M. Roan of the State Safety Commission had a conference on the 8th with the operators and later with the union officials. The latter declared that they would furnish the operators with men to man the pumps and fans, and to keep the mines in workable condition. But the miners are not agreeable to this arrangement and refuse to act in accordance with it, so the mines are filling with water.

Five foreign strikers severely beat a confectioner of Pipe Creek, mistaking him for the engineer at the Johnson mine. His condition is serious. Frank Kochi was struck over the head with a miner's lamp and has issued a warrant for the arrest of three men.

THE CALL FOR THE MILITIA

The sheriff of Belmont County, James H. Anderson, declares he is unable to furnish protection, and the operators are appealing to Governor Cox to call out the militia. John Roan says there is no danger of trouble. So long as the operators consent to see their mines drowned out, there will probably be no trouble, as he says. But if the foreign strikers are to decide whether the mines shall be flooded or be kept ready for service, it is difficult to see why legislators are sent to Columbus.

When Sheriff Anderson called for deputies, out of 50 summoned only seven responded, and in his report to the governor he declared that only two of these were faithful. The danger, as the sheriff sees it, is the stopping of mines where coal for domestic manufacture is produced.

Ohio badly needs a body of constabulary, which will stop trouble at its very inception. The calling out of the militia is a serious matter and consequently is too often delayed till too late to prevent serious damage. A small constabulary force would prevent any attempt at insubordination. The operators already threaten to hold the state responsible for the injury to their operations, and it is likely that the violence so far perpetrated will be followed by more flagrant breaches of the peace and even by dynamiting, for which compensation should be paid.

The interference with the pumpmen has already caused the drowning of 15 mines and the miners have interfered with the building of a protection wall where a gas well passes through a coal mine. The rioters are nearly all Southern Europeans and among these the Italians form the major element.

THE UNION MAKES A FAIR-MINDED REPLY

In a reply to the operators' statement which we briefed last week, the miners declare that their cause must be just in demanding a mine-run scale, because despite the lobbying of the operators, the mine-run law was passed by the state legislature after a careful investigation of conditions in the state and in Illinois, Indiana and West Virginia by a non-partisan commission. They then declare that as the mine-run law became operative only on May 20, they were prepared to continue the old scale from its expiration on Apr. 1 till that date, but they state that "the operators closed their mines in order to starve the miners into submission" to a violation of the law.

They then refer to the offer to give 99c. for lump coal and 2c. for slack, as an attempt to circumvent the law. This evasion of the enactment, they say, they could not permit. They desire, however, to call attention to the fact that the price of hand-picked coal as given above is unimportant, as there is practically no pick work done in eastern Ohio.

They then declare that the price offered by the operators of eastern Ohio for machine work—to wit, 41.12c., is based on 41 per cent. slack, whereas they state operators testified before the Commission that the rate borne by slack to run of mine was only 29 to 33 per cent.

WHY CANNOT ALL OHIO PAY 47c.?

They cannot understand, they say in their plea, why eastern Ohio cannot pay as much as the southern portion of the state, for even if the scale per ton appeared on its face equal between the districts, the eastern Ohio operators would have the advantage, as the dead-work scale is much higher in the southern districts. The smaller payments for dead work in eastern Ohio are not justified, the union asserts, for the work of mining is about equally easy in the eastern Ohio, Hocking Valley, Pomeroy, Jackson and Bergholz districts.

They complain of a heavy soapstone which is 12 in. thick and the full width of the room, and say that it often continues of this thickness for hundreds of feet, and declare that for this nothing is paid. They state that they are not wholly to blame for the fine coal, that part of it is due to squeezes and part to the work of escaping gas and that part of the alleged fine coal is only of that character because of the wearing of the screens and their consequent departure from a standard 1½-in. opening.

They practically admit the ruinous effect of competition, but declare that the eastern Ohio operators are themselves to blame and have been better able to take care of themselves than those operators with whom the union has succeeded in making an agreement. On the whole C. J. Albasin, W. Roy and W. Applegarth, president, vice-president and secretary-treasurer respectively of the subdistrict, certainly make a strong and dignified reply, yet the remarks made last week have a large degree of validity. It is hard to see how the southern operators could see their way clear to make such concessions as they have made.

THE SAFETY COMMISSIONER NEARLY WENT AWAY UNHEARD

John M. Roan addressed a large body of miners in the Bellaire City Hall on the 9th. The miners did not wish to hear him and he was asked to withdraw while they debated on the question whether he should be permitted to speak. It was decided that he could not be heard, but several interpreters were pressed into service and as a result, the refusal to hear him was reversed, though the welcome was sullen and many men left the hall before he spoke.

He stated that the Rail & River Co. could not operate its mines on the old lump-coal scale, as it was against the law to do so. The men had nothing to fear, therefore, from the posting of a notice at the mines of that company stating that it was prepared to do business at the old scale rate. He declared that he believed 47c. per ton would be accepted as the rate for machine coal by the operators in eastern Ohio, and that at least 95 per cent. of the operators would sign the scale, though he had no certain knowledge on which to base his expectations. He ended, "So be careful, boys, do not show violence, uphold your officials, stay away from the mines and things will adjust themselves."

THE DESTITUTION IN OHIO

It is only fair to state that the union officials in trying to suppress violence, in obtaining a hearing for Roan and in making such conservative statements as they have issued are worthy of public approbation, but they are not able to insure peace, as the foreign element desires to win by violence and the financial difficulties are almost insuperable and make the miners hard to control.

In the town of Neff, near Wheeling, W. Va., 15 families were on the edge of starvation on the 3rd of July, 9 bread-winners having left their families. An Athens County merchant, on the 6th, stated that the miners had stolen heifers from the open field and killed them in order to avoid starvation. He said that, in Athens County alone, the merchants had advanced \$200,000 worth of goods to the striking miners.

At Klee 28 miners from Redtown walked into the W. C. Parker grocery and stated they had had no food for several days. The grocer is a member of the board of township trustees. Each man was given by the board \$2 worth of groceries. These are a few instances of the state of starva-

tion to which the men are reduced in fighting for what they believe is a fair rate of pay. Consequently, even granting the men are well disposed, some rioting is not unlikely and a force to maintain order should be on the ground to oppose the unruly.

THE SOUTHERN DISTRICTS WILL RESUME ABOUT JULY 20

Arrangements are being made to start mining in the four Ohio districts which agreed upon a wage scale, and it is the consensus of opinion that resumption will take place by July 20. At a convention of miners held in Columbus last week the new scale of 47c. for machine-mined coal and 67.6c. for picked-mined coal on the mine-run basis was accepted. The referendum vote of the miners was also favorable and the determining of mining conditions delays a general resumption in the various sub-districts of the state.

It is believed that this work can be accomplished during the coming week. The Ohio Industrial Commission must determine the percentage of impurities to be allowed in the coal mined, and this matter will be taken up at once. The question of the amount of fine coal to be allowed is one for adjustment between operators and miners, and failure to arrive at a conclusion throws the question also on the industrial commission.

It is expected that arrangements will be made with the miners in the Hocking Valley district for the use of the present tipples until they can be changed to conform with the mine-run law. The miners will probably agree to this delay. The cost of changing tipples in the whole state is estimated between \$2,000,000 and \$3,000,000.

OKLAHOMA MINES DO NOT WANT ARBITRATION BOARD

In Oklahoma, the chief point of issue in the miners and operators conference is that part of the agreement providing for arbitration between local unions and operators. The latter want the board of arbitration to be permanent; the miners want some one chosen to try each separate case after the joint board has failed to reach an agreement on any dispute.

THE KANAWHA DISPUTE NOT WHOLLY SETTLED

There has been some trouble in the Kanawha region, the miners not being ready to go to work even though an agreement has been signed. The Hickory Ash Coal Co. at Peytona on Coal River and the Kellys' Creek Colliery Co., both have strikes on hand. The officials of the U. M. W. of A. District No. 17 and the Kanawha Coal Operators' Association held a joint session on July 10, but the chances of a settlement seem remote.

THE PRAIRIE CREEK DISTURBANCE

The trial of P. R. Stewart, Jim Slankard, Frank Grippano, John Manick, Clint Burris and Sandy Robinson before Judge Frank Youmans on a charge of violating the federal injunction, restraining them from interfering with the operation of the Mammoth Vein Coal Mining Co.'s mine No. 4 at Prairie Creek, Ark., has introduced some interesting testimony. It appears from the evidence that F. W. Holt, secretary-treasurer of the U. M. W. of A. District 21, purchased 20 to 25 rifles and 100 rounds of ammunition for each gun. These he shipped to Oscar Layton, who is declared by the agent to have received a consignment answering the description given by the hardware merchant who sold them.

P. R. Stewart is alleged to have declared that he would rather die than see the mine run open-shop, that the men who wanted guns could get them, and that there would be another Colorado at Prairie Creek. It was stated, however, that much of this violent utterance was caused by the announcement that two of the marshal's guards had assaulted two Prairie Creek girls and when the mother interfered, the guards used profane words in reply.

INTIMIDATION OF STRIKE-BREAKERS

Others were accused in the testimony of preventing strike breakers from leaving trains, using baseball bats as a menace. In reply, it was stated that the bats were being carried home from a game and were not used for purposes of violence. The men, however, were declared to have tried to dissuade the strike-breakers from entering the employ of the company. Some swore that the guards tried to make the strike-breakers leave the trains on their arrival at the mine and that, being in sympathy with the miners, after hearing their story, the strike-breakers refused to leave. This they claimed was the cause of the scuffle on the train.

Others were accused of destroying hay and feed bags, and in reply it was stated that the guards were themselves to blame, ripping the feed bags open by throwing household goods from the car door when unloading a car. It seems that the guards' actions toward the women of Prairie Creek did really arouse much indignation and cause Stewart to make some of his threats, even if there were other less permissible

causes for his actions and fiery language. The testimony of a female school teacher that she saw several men with guns trying to remove men from the train, seems to confirm the story of the strikers, that the disturbance in the railroad coach was not chargeable to them.

Tennessee Mines More Coal

The production of coal in Tennessee in 1913 was, according to E. W. Parker, of the U. S. Geological Survey, 6,903,784 short tons, valued at \$7,833,714. More satisfactory labor conditions, better transportation facilities and an improvement in market conditions was evident in the coal trade of Tennessee, and the effect of these three influences is exhibited in an increase of production of 430,556 short tons, and \$503,811, or nearly 7 per cent. in both quantity and value, compared with 1912.

In neither 1912 nor 1913 did the production reach the high figure of 1910, when it amounted to 7,121,380 tons. On the other hand, in both the later years the average value per ton was higher than in 1910.

The coal mines of Tennessee were not entirely free from labor troubles in 1913, as there were 857 men on strike during the year with an average of 50 days each of lost time. The total number of men employed was 11,263 and the average production per man was 613 tons.

The quantity of coal washed in 1913 was 707,773 tons, which yielded 624,426 tons of clean coal, and 86,347 tons of refuse. Most of the fuel washed was slack used in the manufacture of coal. The coal-mining fatalities of Tennessee in 1913 were 35, compared with 18 in 1912.

According to the United States Census, 588 short tons of coal were produced in Tennessee in 1840, and it is probable that little fuel was produced in the state before that time. By 1860 the production had increased to 165,300 tons, but after that time development was retarded by the Civil War. Since 1870 the production of Tennessee has increased regularly, but not so rapidly as that of Alabama.



"DOLLAR," A MINE MULE HAS BEEN PENSIONED BY THE ROCKY MOUNTAIN FUEL CO., AFTER 15 YEARS SERVICE. IT IS AN EVERYDAY SIGHT TO SEE HIM SITTING UP AS SHOWN IN PHOTOGRAPH. HE SEEMS TO GET MUCH PLEASURE FROM RESTING IN THIS POSITION

Centrifugals in the Byproduct Coke Industry

BY LESLIE GRISCOM*

So far as the coke industry is concerned, the centrifugal finds its principal use in the drying of ammonium sulphate as it comes from the saturators or settling boxes. It is used also for drying sulphur, naphthalene and other byproducts, but the coke-plant man is most interested in its operation on the substance first mentioned.

This service is exacting for several reasons. The material is heavy, the liquid has but little viscosity and the bulk of it is thrown off so quickly that the material has a tendency to set before equalizing in the basket, causing unbalanced loads. The centrifugals for this service must therefore be self-balancing and strongly constructed, with ample bearings, and owing to the free acid in the sulphate, all parts coming in contact with the material must be acid resisting.

While a correctly designed centrifugal machine will handle a load much out of balance without injury, attention to loading with a view to even balancing, will be well repaid in lessened cost of repairs and longer periods of continuous service. The best results have been obtained by charging the baskets while running at about one-fourth speed or less.

EVEN, UNIFORM LOADING IS ESSENTIAL

The best speed can be readily determined by experiment and should be maintained as nearly as possible in operation. The material should be run in evenly and not in large quantities with intervals between. If, by any chance, a very uneven loading is secured which does not equalize with subsequent additions of material, the machine should be stopped and the load redistributed. This takes but a few moments and saves unnecessary wear and vibration.

Men operating centrifugal driers should receive careful instruction and sufficient supervision to insure the

proper loading and lubricating of the machines, otherwise the cost of maintenance may be unnecessarily great.

The principal metals entering into centrifugal construction depended upon for the parts exposed to acid are copper, lead, bronze and "monel" metal. Bronzes should not contain scrap, but be made from new material properly alloyed. The use of bronze, copper and "monel" results in a durable machine at a high first cost. Sheet lead serves to protect the interior of the curb, but should not be used for the revolving parts.

PRECAUTIONS TO BE TAKEN

Where steel castings are used for basket bottoms these should be protected by copper rather than lead, as this is better adapted to withstand the rough usage due to scraping out the material and to the effects of centrifugal force.

Users of centrifugals for the drying of ammonium sulphate should look closely into the matter of the material entering into their construction. A cheap machine can be built for less than the cost of the raw materials entering into a higher-grade article.

As the centrifugal is a high-speed machine, it should be well lubricated. Whether fitted with an automatic oiling system or not, the lubrication should receive attention at frequent intervals.

In regard to the type, the machine should be, of course, arranged for bottom discharge. The underdriven variety gives unobstructed access to the basket for loading and discharging. This type has been generally adopted by the larger byproduct concerns with a few notable exceptions. Occasionally structural conditions favor an overdriven machine.

Schaum & Uhlinger, Inc., of Philadelphia, have specialized for years on centrifugal driers for operation on ammonium sulphate. The byproduct department of the big steel works at Gary has 22 of these machines in a single line. Many other great manufacturers of coke throughout the country use this same kind and make of apparatus while machines were recently ordered with which to equip the new plant of the Minnesota Steel Co., at Duluth.

*Schaum & Uhlinger, Philadelphia, Penn.



THE NEW ENTERPRISE COAL CO., NEAR FORDVILLE, WILLIAMSON COUNTY, ILLINOIS, IS STRIPPING A 5-FT. BENCH OF COAL. THE BED IS OVERLAID WITH A NATURAL COVER OF 12 FT. OF CLAY, WHICH IS REMOVED BY A MARION STEAM SHOVEL WORKING IMMEDIATELY ON TOP OF THE COAL SEAM. MINING COAL BY THE STRIPPING PROCESS PROMISES TO BECOME QUITE AN INDUSTRY IN ILLINOIS AND INDIANA.

Editorials

Are You Proud of Your Record?

A number of mine managers and superintendents have recently sent us their records of production, accidents, miners' efficiency (as indicated by output per man employed), etc. From time to time we have published these data in COAL AGE for the information of others in the industry.

Now, one of our friends suggests that we print an occasional column covering records of different men in different companies. We believe the idea is a good one, for in all that we do, practically the only way we can determine the value and efficiency of our efforts is by comparison with the results of others. What we are all aiming at is high output with low waste, low cost and a low accident rate.

Everyone, of course, understands that conditions in mines differ widely. One superintendent may be obtaining higher efficiency than another superintendent, even though the latter is securing the greater output per man employed. In the former case, the workings may be in a thin seam where the physical difficulties are numerous, while the latter mine may be working under extremely favorable conditions. However, we are sure it will be interesting to the entire industry to know what records various companies and individual mines have attained, and we, therefore, invite all our readers to contribute brief statements of the results they have secured in hoisting, hauling, undercutting, entry driving, etc. Or if you have managed a mine for a year or several years without any fatalities occurring, it is something of which one may be thankful and proud. Others who hear your story will endeavor to emulate your example and duplicate your record. The industry doesn't even know definitely which anthracite or bituminous mine is securing the greatest total daily output.

We prefer that the name of the mine and contributor be attached to each record, but where this is deemed inadvisable, we will be willing to withhold such identity. We trust that all our friends will send us information along the lines indicated, and we are sure the industry will be enlightened and benefited thereby.

Where Attention Counts

There is perhaps no class of machinery employed around coal mines with which care in operation pays greater dividends than air compressors. Although these machines are perhaps no more complicated than some others that may be met with in the coal-producing industry, they nevertheless represent a high initial outlay, and any trouble arising in the valves or other comparatively delicate parts must receive prompt attention or serious damage may be done.

Ordinarily, the compressors employed in mining plants are driven by steam engines which are built into and form an integral part of the air compressing unit. Many forms of steam valve gears as well as tandem- and cross-

compounding of the steam cylinders are employed. So far as the compressing end of the machine is concerned, however, it matters not whether the air pistons are driven by an engine, a motor or a water-wheel, the basic principles of operation are the same in all cases.

In general, air compressors require the same kind and quality of attention as do steam engines, and certain fundamental and cardinal points must be observed.

The machine should be kept clean.

Nothing but clean, pure air should ever be allowed to enter the intake.

Valves and pistons must be kept tight; otherwise, efficiency will suffer.

Cylinder lubrication should be accomplished by means of a small amount of high fire-test compressor oil, alternating for about equal periods with soap suds to remove any accumulation of carbon that might be present.

Special attention should be given the cooling water, which should be kept running freely, and thoroughly filling the water jackets and inter-coolers.

Gauges should be watched closely; when abnormal pressures are indicated, the cause therefor should be immediately investigated.

Nine-tenths of all air compressor troubles are caused from leaks, dirt, inattention to jacket water or poor or excessive oil. Leaky valves or pistons usually cause undue heating, which should be looked into at once. Inter-cooler gauges ordinarily act as telltales of faulty operation. Neglect of their warning or procrastination may result in damage to the machine, or, what is much worse, serious physical injury or even loss of life.

With a proper regard for the comparatively simple precautions mentioned above, the care of either high- or low-pressure compressors is by no means arduous, and one man may easily attend several machines.

But he who has charge of only one machine, and wittingly or unwittingly allows coal dust, sand or grit to enter the intake, floods the cylinder with a lubricant ill-adapted to compressor requirements, allows leaks to develop in valves or piston rings or the inter-cooler tubes to become clogged with dirt or scale may lead a veritable "dog's life."

West Virginia

It may not be generally known that in many important ways West Virginia mines have a leadership over those in other states. Their principal claim to distinction is in their adoption of conservational practices. It is true that the method of extracting coal now followed in all the modern mines of the state was anticipated in parts of the Connellsville region, and we have even seen documentary evidence that the Pocahontas field took its system of mining directly from the Pennsylvania coke regions. In the Fairmount field, however, the mining methods are almost identical, but they may have been independently evolved.

We are not disposed here, however, to discuss the

growth of the system and award laurels for the discovery, but rather to give West Virginia credit for extracting a larger percentage than any other state by sound mining methods. In no state is the percentage of first recovery lower and in none is the final extraction higher, and in hardly any field is as careful a record kept of the percentage of coal secured.

It is not a proud boast for Pennsylvania that it originated and developed an excellent system of mining and then largely refused to adopt it and continued to operate in a more wasteful manner. Nor is it creditable to Illinois that its percentage of recovery is small in all but its longwall workings.

Illinois, like West Virginia, could have adopted these methods, but instead it has kept to the wide room, narrow pillar, short breaking line and unsighted breast, and has only attempted to secure itself by large breaking pillars, and experience is showing that these are unequal to the work that is demanded of them—that of correcting the other four faults in the methods just enumerated.

It is true that the labor union has been partly the cause of the unmethodical methods of many states, though just the same faults are to be found in those which are unorganized. We think, however, that had Pennsylvania, Illinois and other states really valued conservation and clearly seen all the values which are cast away with wasted coal, they would have, one and all, found a way to do better work. As was stated at the Coal Mining Institute of America, the Pennsylvania operators have always sought too large a first recovery, and A. P. Cameron suggested that if a reduction in primary extraction was more common, the fatality rate might possibly be decreased. This precaution against weakening the mine by excessive "first mining" has been one of the chief merits in West Virginia management.

But West Virginia has the distinction that she has a number of mining men, mostly, we admit, with the Consolidation Coal Co., who have been willing to give the benefit of their experience to the world at large. And there is not a little that we have learned from them. The custom of dampening the intake to decrease the risk of explosions arose in West Virginia and has been adopted at nearly all the mines in that state. Many workings in Pennsylvania, Illinois, Kentucky and some in Colorado are following the lead of West Virginia in this matter.

The state also, we believe, introduced the steel mine tie and railroad-car retarders, and was certainly one of the first to use concrete for stoppings and overcasts, to purchase portable fans for immediate use in mine explosions, and to analyze the air current to determine the presence of methane.

There still remain in West Virginia, as in other states, old-time mines with antiquated methods, but those who see the new West Virginia realize that in a few years there will be few fields better developed, and few where more care is taken to provide favorable living conditions.

Unfortunately, the mining industry is the principal resource. When miners and operators in West Virginia are in conflict there is no sufficient body of disinterested people to umpire the disagreement and show that, after all, conditions are not unfavorable. The papers side either with John or his employer, and their partisanship is natural, as there is no large body of readers whose interests are with neither party. The public is always ready to believe anything of men they have never met

in a land they have never seen. Unfortunately, even when ill informed, the public will try to form an opinion, and does so, not so much from knowledge, which it does not have, as from prejudice, which, undeterred by correct information, works overtime.

In no small degree is it creditable to the West Virginia operators that two important ameliorative movements have found in that state their active support. One of these is the closing of the saloons through the length and breadth of the state. This improvement became operative on the first day of July, and has the approval of the mine owners. Another need of the industry which the West Virginia operators have cheerfully met is the liability law. Some of the corporation chiefs in other states, who have been disposed to regard West Virginia coal companies as lacking in any interest in their miners, will recognize in this law legislation of a kind which *they*, for the most part, have vigorously fought.

In fact, decency and thrift are bid for sedulously in these two good measures, and there is little doubt that if the operators throughout the state insist that the anti-saloon law be kept, West Virginia will soon lead its neighbor states not only in per capita earnings, but in per capita savings and individual character.

✱ **A Fan House Fire and Its Lesson**

At a recent fire, near Williamson, W. Va., five men lost their lives. It is believed that the fan house at this mine was ignited in some way or other from the electric connections to the driving motor. The fan, which continued running for some time after the fire started, not only furnished a strong draft for the blaze, but forced it into the mine airway with disastrous results.

This fire has not been without its lesson. It was scarcely extinguished before Earl Henry, chief mine inspector of the state, was at work examining records of similar occurrences and drafting a bill for presentation before the next legislature, making it illegal in the future to construct fan houses in West Virginia of inflammable materials.

In mining, as in most other industries, progress is only made through experience followed by action—and the prompter the action, the more rapid is the progress.

✱ **Domestic Science in Mining Towns**

The Elkins Coal & Coke Co., are establishing domestic science schools in Preston County, West Virginia, along the Deckers Creek, at Bretz, Masontown and Richard. This creek may be best located by remembering that it enters into the Monongahela River at Morgantown, W. Va. Funds for the undertaking have been supplied by Mrs. Stephen B. Elkins.

Miss Anna O'Dea, who has had 15 years' experience at similar work, partly in Thomas and Davis in the adjoining county of Tucker, also for Mrs. Elkins, has taught school in Washington, Baltimore and on the Pacific Coast. Miss O'Dea spends two days a week at each of the three towns and has about 25 pupils at each school. Only sewing and cooking are now being taught. Later, the care of the sick will be added. At Bretz, the school house, and at Richard and Masontown company houses are being used for the classes just formed.

Legal Department

Recent Judicial Decisions

Suits for Death of Miners in Illinois—Where a coal miner is killed in Illinois through negligence attributable to negligence of his employer, and leaves, as his nearest surviving relatives, his parents, brothers and sisters, the parents alone are entitled to maintain suit for damages. (Illinois Supreme Court, *McFadden vs. St. Paul Coal Co.*, 105 "Northeastern Reporter," 314.)

Selling Short Weight as False Pretense—A retail dealer in coal or coke may be convicted of obtaining money under false pretenses by selling short weights, although the prosecuting witness paid for the coke under suspicion that it was short in weight; he not knowing positively that this was so until he had weighed the fuel. (North Carolina Supreme Court, *State vs. Ice & Fuel Co.*, 81 "Southeastern Reporter," 956.)

Intrastate Character of Coal Shipment—When a contract for transportation of coal from a point in one state to a point in another is performed, reshipment of a carload to a second point in the latter state must be regarded as an intrastate transaction, and as such subject to state regulation, although the coal is reshipped in the same car in which it was carried from the other state. (United States Supreme Court, *C. M. & St. P. Ry. Co. vs. State of Iowa*, 34 Supreme Court Reports, 593.)

Effect of Illinois Compensation Act—It being optional with both employer and employee whether they will be governed by the provisions of the Illinois Compensation Act, the latter cannot compel the former to come under the law, but an employee need not elect to be governed by the law, if the employer does not, in order to cut off the defenses of contributory negligence, assumption of risk, and negligence of a fellow servant in a suit brought for personal injury. But both parties are presumed to be governed by the law unless notice is given to the contrary as provided for by law. (Illinois Supreme Court, *Dietz vs. Big Muddy Coal & Iron Co.*, 105 "Northeastern Reporter," 289.)

Effect of Mining Lease—"A mining lease for a term of 99 years, in consideration of \$1 and the payment to the lessor of three cents per ton of coal and other minerals mined and shipped, containing no covenant by the lessee to commence mining at any certain time, does not vest title in the lessee to the mineral in place. In such lease there is an implied covenant by the lessee to begin mining within a reasonable time, and if he does not do so, he will be presumed to have abandoned his right, and a court of equity will, at the suit of the lessor, cancel the lease as constituting a cloud on his title. The fact that the lease is upon land so remote from a railroad that shipment of the coal is impracticable at the date of the lease does not affect the question of reasonableness of the time, when it does not appear that the parties contracted with reference to some particular railroad which would afford shipping facilities, the building of which was then contemplated and has since been completed." (West Virginia Supreme Court of Appeals, *Chandler vs. French*, 81 "Southeastern Reporter," 825.)

Liability of Shipper of Coal—Unless the contract for transportation of coal provides to the contrary, the shipper is liable, not only for the freight charges, but also for demurrage accruing after he has been notified by the carrier of the consignee's refusal to accept delivery. The carrier's lien in such case against the coal extends to demurrage as well as freight charges. "When the coal was loaded into plaintiff's cars and consigned to the Interlake Fuel Co. there was an implied guaranty by the consignor that it would be received by the consignee. The shipper never ceased to be liable for the freight, and when the shipment was rejected it became liable also for the demurrage, occasioned by its breach of duty in disclaiming ownership and in not advising plaintiff what disposition to make of the coal, after it was notified that the consignee had declined to receive it. It then became the duty of the consignor to relieve the railroad company of further detention of its cars." But, to fix this liability, the carrier must give the shipper notice of the consignee's failure to receive the shipment. (West Virginia Supreme Court of Appeals, *Baltimore & Ohio Railroad Co. vs. Luella Coal & Coke Co.*, 81 "Southeastern Reporter," 1044.)

Must "Nut and Slack" Coal Sold, Be Dry?—Plaintiff, a coal mining company, contracted to sell mixed "nut and slack" to defendant, a selling company, shipments being made direct to the latter's customers. When the contract was made, and while the earlier deliveries were made under it, the mining company shipped dry coal to one of defendant's customers, who made no complaint until the mining company put in a washer at the tipple which had the effect of changing the manner of mixing the nut and slack as it was loaded on the cars. The wet coal would sometimes freeze in the car, making it difficult to handle by means of an automatic stoker. The selling company then procured dry nut and slack from another source at an increased price per ton for use of the customers, and sought to offset the excess of the cost against a balance due plaintiff, claiming that plaintiff impliedly warranted that the coal would be dry—that the term "nut and slack" has a definite meaning in the trade, and relates not only to the size of the nut and the fineness of the slack, and the proportion of each in a carload, but also to the manner in which they were to be mingled in the car. But the court into which this controversy was carried decided in favor of the mining company on this point, saying: "There is no evidence that plaintiff sold the coal with reference to its being used in any particular device for the handling of it, which required dry coal, and therefore there was no implied warranty that it would answer such purpose." Another part of the opinion reads: "This correspondence shows that the washed coal was better than the unwashed; that it contained more heat units, which is the most desirable quality in coal. It also tends to show that defendant regarded it of greater market value than the unwashed. The defendant's customer was the dissatisfied party, not defendant, and its complaint was not because of the quality of the coal. The gravamen of its complaint was that the washed coal would not work well in the automatic feeder, which carried the coal to the furnace." (West Virginia Supreme Court of Appeals, *Buffalo Collieries Co. vs. Indian Run Coal Co.*, 81 "Southeastern Reporter," 1055.)

Mine Operator's Duty to Provide Safe Place of Employment—Although the general rule of law that an employer is bound to use a reasonable degree of care to provide a reasonably safe place of work applies to coal mining operations, and a miner is ordinarily entitled to presume that this obligation in his favor has been properly discharged, unless he has knowledge to the contrary, or the surrounding circumstances are sufficient to advise him to the contrary, the rule has "no application to cases where (a) the employee is engaged in making, or it is by express custom or contract his duty to make the place safe; or (b) where the employee is engaged in 'making his own place', and where the character of the work is such that the condition of the place as respects safety necessarily changes as the work progresses, and by reason of such work. The reason of this latter exception is that it would be impracticable, if not impossible, for a master in such a case to look out for the safety of the employee while operations of the nature stated are being carried on. . . . This exception has special application to the work of cutting down and blasting coal, where the character of the place is constantly changing, and where, therefore, the employee may properly be said to be making his own place of work. And it is because of this consideration that, in the absence of statute, the question of liability or non-liability of the employer has frequently been made to turn upon the question of whether the place of accident was an 'entry' used only for passage to an fro, or, on the other hand, a 'room' which was being used by the employee. But in the absence of statute, the distinction as applied to the question of relative duty we are considering is not alone between an entry used merely as a passageway, and a room as being a place where work of any kind is being done. Whenever the place where the work is being done ceases to be one which the employee makes for himself, as an incident to his work, and the work being done does not necessarily change the character of the place as respects safety, the obligation of reasonable care to keep the place safe rests primarily upon the employer." (United States Circuit Court of Appeals, Sixth Circuit, *Dasher vs. Hocking Mining Co.*; 212 "Federal Reporter," 628.)

Device to Operate Mine Switches

By WILLIAM McMAHON*

Having read with much interest the many articles published in COAL AGE, relating to the numerous devices that have been installed in many of the larger mines, with a view to greater safety, or having for their object both safety and economy of production; I herewith submit an idea for turning switches on main haulage roads in mines, for which I hope you can find space.

Actual experience has shown that such a device is very much needed at a great many mines, especially on the main roads where the switches must be frequently operated, and where the drivers must generally stop their trip to do this. In many cases where the traffic is heavy and locomotives are used on the main roads, boys are kept for turning the switches and, to say the least, the work is a dangerous occupation for boys. The proper installation of an automatic device

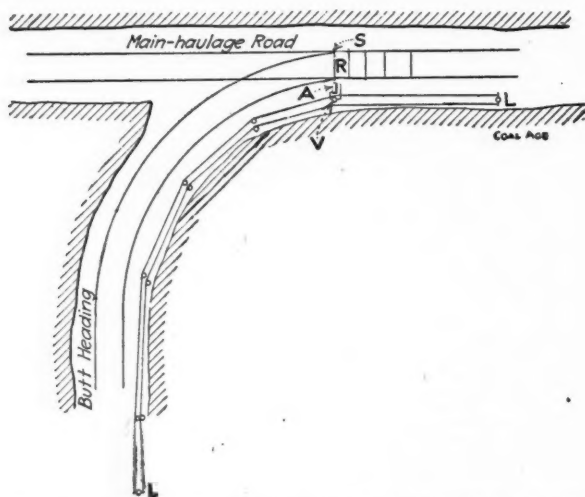


DIAGRAM SHOWING ARRANGEMENT OF DEVICE TO OPERATE SWITCH

would entirely eliminate this danger, as it would enable the driver himself to turn the switch without either leaving or stopping his trip. As will be understood from the accompanying diagram this device can be operated from any convenient distance on either side of the switch. Whatever way the driver approaches, he can operate the switch as he desires. He can, also, again throw the switch if he wishes, after clearing the same.

This device, which can be operated by means of electricity, compressed air, or by the use of a few simple bell-cranks and wires, will soon be put in operation at the Canada West Mine, Taber, Alberta, Canada. This mine is extensive and electric locomotives are used on the main haulage roads. The officials feel sure of getting good results from the use of this switching device, which will be operated by means of compressed air. Red and green electric lights will be used as signals.

A study of the diagram will show the arrangement proposed at this mine. A small air cylinder *A*, in this instance, is anchored firmly to a sleeper that extends under the switch *S*. The switch rod *R* connects the switch with the air cylinder, by which it is thrown

in either direction. The valve *V* controls the admission of air to either end of the cylinder *A* and is operated by the vertical hand levers located at *LL*. I will be glad to give any further information desired.

Coal Production in North Dakota in 1913

Although the production of coal in North Dakota in 1913 was, according to E. W. Parker, of the U. S. Geological Survey, only 459,320 short tons, valued at \$750,662, there are some extremely interesting facts regarding the possibilities of the vast deposits which underlie that state. All the present mineral fuel produced in North Dakota is brown coal or lignite. Considerable areas of sub-bituminous of usable quality and workable thickness are believed to underlie portions of the lignite areas, but no attempt to exploit the sub-bituminous coal has yet been made. Compared with 1911, when the production attained its maximum record of 502,628 tons, the output of 1913 shows a decrease of 4160 tons. The relatively small differences in production during the last three years indicate an absence of any fluctuating influences, and show that active development of lignite properties will wait upon increased population.

At present, the lignite is used chiefly for domestic purposes, but with proper equipment it can be employed with satisfaction as a boiler fuel. A convincing example of what may be accomplished with lignite for such purposes is presented by the irrigation plant of the United States Reclamation Service, at Williston. The lignite here employed is taken from the Olney coal mine, owned and operated by the Government. The Reclamation Service operates the mine and uses the product in the generation of steam for its pumping plant connected with the irrigation project.

The water is raised from the Missouri River and delivered to an extensive system of canals and ditches by which a large section of the valley is irrigated. At Kenmare, Scranton and Dickinson, lignite is also successfully used in the burning of brick, for which its smokeless and sootless qualities, and relatively low cost, make it adaptable.

The mine of the Reclamation Service consists of a series of drifts on a 9-ft. flat bed. The galleries or underground workings are at an average depth of 100 ft. below the surface.

The average output at present is 100 tons per day, and the coal is transported to the crusher near the power plant on cars hauled by mules, and is there broken to nut sizes. The mine employs from 12 to 15 men during the irrigation season or for about five months in the year. The average output is 6 to 10 tons per miner daily, and the net average earnings are from \$3.50 to \$5 per day of eight hours. The men are furnished with permissible explosives at a slight advance above cost.

As the gas producer and the internal-combustion engine in large units come into more general use in the West, as they are rapidly doing in the East, the lignite of North Dakota will be recognized as possessing great potentiality in the settlement and economic development of the state. Experiments also show that lignite can be successfully briquetted, after which it stands transportation well, and its heat value is increased from 50 to 70 per cent per unit of weight.

*Taber, Alta., Canada.

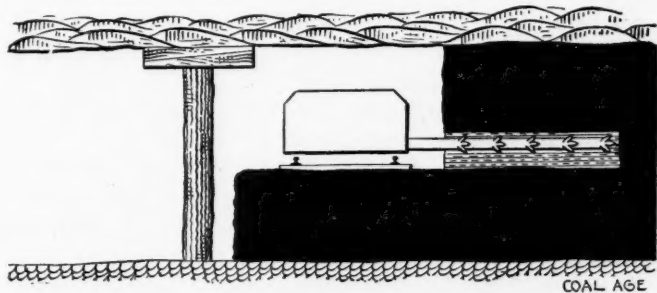
Discussion By Readers

Working Coal Seam with Heavy Parting

Letter No. 4—Replying to Fred Morck's query, asking if it would be practicable or profitable to work a 5-ft. seam of coal having a parting in the center varying from 6 to 18 in. in thickness, I would say that there is no doubt in my mind as to the practicability of working such a seam of coal with profit. The conditions described are almost ideal for the adoption of the longwall system of mining. If the seam lies fairly flat and faults are not too prevalent, mining machines can be used to advantage.

It is unnecessary to give a detailed account of the longwall system, which has been fully described many times in *COAL AGE*, and I will only refer to the main points that should be considered. The mining may be done either by hand or machine, but the cutting should be made in the center parting whenever this is possible. By that means, a large percentage of the waste material in the parting will be removed and thrown into the gob, instead of being shot down and mixed with the coal.

If machine mining is adopted the upper bench of coal should be worked forward, as shown in the accompanying figure, so as to provide a bench or floor for the ma-



WORKING A COAL SEAM IN TWO BENCHES

chine to rest on while making the cutting in the parting. To do this, in the start, the mining must be done by hand and the top coal shot down. A track is then laid on the lower bench of coal as a floor. When the machine is placed in position on this track, a cut is made along the full length of the face, which should be as long and as straight as possible.

After the passage of the machine, and when the refuse has been cleared away, the bottom coal is removed with wedge and pick, or by means of shots if the coal should prove too strong. Later, the top coal is taken down by similar means. This leaves the face of the coal in the same form as before and ready for the machine to make another cut. Should the top coal thin out so as to leave insufficient headroom for the machine to work, it will be necessary to make the cut at the bottom of the seam, in the lower bench of coal or in the floor, if that it not too hard.

When a large tonnage is desired from a short length of face, the distance between the roads must be lessened

by making them, say 30 ft. apart. The machine work should be done at night, when the miners are out of the mine; and the coal should be broken down and loaded out during the day. This shortening of the length of face between the roads, however, is not to be recommended, except where it is necessary for the face to move rapidly on account of bad roof or as the demand for coal requires. The cost of brushing the roof on the roads is high, and it is often difficult, at the end of the day, to leave the face clear for the machine to work. Under the existing good roof, however, the roads can be set out at greater distances, which will reduce the expense of keeping up the roads, but will require more time for loading out the coal.

The advantages in favor of machine mining are as follows: 1. More round or lump coal is made. 2. The cost of getting the coal is reduced. 3. The tonnage per man is increased. 4. The length of face required for a given tonnage is less. 5. The workings can be concentrated and the length of roads reduced.

The question of profit can be better judged by the man on the ground; but, from the statements made, in regard to the quality of the coal and its proximity to a good market, there seems to be little doubt that this coal can compete successfully with other coals in the same market.

J. E. SPICER.

Cumberland, B. C., Canada.

Letter No. 5—In the inquiry in regard to the best method of working a coal seam with heavy parting, Mr. Morck does not mention the depth of cover or whether the seam is inclined. Since the coal is described as being close to a good market and being superior in quality to 75 per cent. of the coal mined in Iowa, I believe the installation of an electric plant would be a profitable investment. The analysis of the coal, as given, shows it to be superior to that of many coal beds that are being mined to day at a profit.

It is stated that, owing to an exceptionally good roof and bottom, the quantity of timber required is reduced to a minimum. This feature is favorable to the driving of wide rooms, which would give ample space for the stowage of the refuse material forming the parting in the seam. Under these conditions of good roof and floor, I would drive all entries and air courses say, 14 ft. wide, which would avoid the expense of yardage and give ample space for the stowage of waste material at the side of the road. This plan is what I call the "gob-entry" system.

The seam should be mined by a chain-cutting machine, the cut being made in the parting. To do this it would be necessary to mount the machine on a suitable truck that would enable the cut to be made at the required height above the floor. Another plan would be to work the top bench of coal far enough ahead to enable the machine to work on the bottom bench as a floor.

I would not suggest the above plan if the seam had an inclination above 15 deg. If proper advantage is taken of the conditions described, the roof pressure can be made to assist the mining of the upper bench of coal, which will greatly reduce the amount of powder required, as compared with the method of shooting off the solid, which will mean less danger of accident from the firing of shots.

CLAUDE W. CARRUTH.

Midland City, Ark.

The Eccles Explosion

I was much interested in the comments of Mr. Smith on The Eccles Explosion, COAL AGE, June 6, p. 943. He says a mine of this size should be worked on the "long-wall plane system," with triple entries. I would like Mr. Smith to explain how he would work a 9-ft. seam of clean soft coal with hard sandstone roof and a hard slate bottom.

I do not think Mr. Smith does justice to the mining fraternity of West Virginia by his remarks, when he says there is evidence that the compensation act, by distributing the blame, is decreasing the sense of personal liability. I do not see how the compensation act will render either the mine foremen or the superintendent immune from the action of the law; and I do not think that the mine operations of West Virginia would allow any decrease of vigilance along that line. I am thoroughly convinced that the accidents cost the coal companies more under the compensation act than formerly.

MINE FOREMAN.

Stotesbury, W. Va.

The Foreigner

I read with interest the editorial on the necessity of the foreign miner, coming to this country, being educated and being able to use our language, COAL AGE, June 27, p. 1058. The movement for betterment strives to make these foreigners good citizens of this country. There are three things that I think are essential, in order to make the foreigner a good miner and a good citizen. They are as follows:

1. Every coal company should have a reading room and a good playground for the use of their employees. They should start classes where every employee who is a foreigner can learn to read and write the English language.

2. Each man should pay 10c. a month, for this education and for his books; and this amount should be deducted from his pay.

3. Every coal-mining state in this country should pass a law making it necessary for each miner to have a certificate, showing that he is capable of working as a miner.

I believe that if these suggestions were adopted and carried out by each coal company, it would go far toward reducing the accidents that occur in mines. There would, also, be less drinking of beer and greater efficiency would result in mining work.

JOHN MAJER.

Listie, Penn.

The Air Factor in Mine Explosions

I have read with interest the intelligent remarks made by I. C. Parfitt, on this subject, COAL AGE, June 27, p. 1059. If the sketch he has presented accurately represents Mr. Verner's views, then there is practically nothing further to discuss in that connection, as he has made quite clear what is to be understood by the "reverse current." I much appreciate Mr. Parfitt's reference to the need of further study and experiment, on the part of the Federal Bureau of Mines, to prove or disprove my theory of "detonation," in its relation to mine explosions.

The terrible disaster at the Senghenydd colliery, in South Wales, Oct. 14, 1913, in which it is estimated that 429 lives were lost, furnished a notable demonstration of what may rightly be called "detonation." The published official report and plans of the mine in this disaster show that all of the persons in the Ladysmith district of that mine and in the roads leading thereto were instantaneously killed, in their working places, with the single exception of those in a small outlying district. The same instantaneous effects were demonstrated in the previous explosion in the same mine, May 24, 1901, when 81 lives were sacrificed.

In the inquiry into this disaster, neither the government commissioner nor the two assessors, who held a special court of inquiry made any comment on this particular feature of the explosion. Two places were suggested as being the possible location of the origin of the explosion; and both of these were outside of the Ladysmith district. It may well be asked, Why were the men in the Ladysmith district killed instantly? Was this the result of *detonation*, or what was the probable cause? This question may never be answered to our satisfaction, and the mystery remain unsolved.

Referring, again, to the air factor in mine explosions, the paper recently contributed to the Royal Society of London, by W. A. Douglas Rudge, M.A., on the Electrification Produced during the Raising of a Cloud of Dust, is of interest. In the same bulletin, No. A, 618, with this paper is another by Prof. W. M. Thornton, D.Sc., Director of Engineering, Armstrong College, Newcastle-on-Tyne, on the Electrical Ignition of Gaseous Mixtures. It is not often that two subjects so intimately connected with the unexplained phenomena of colliery explosions, are to be found in the same bulletin. The allotted space will not permit of an exhaustive review of these papers; but a summary of the conclusions reached therein will be of interest.

The following extracts are taken from the first paper mentioned, summarizing the conclusions of its author:

The raising of a cloud of dust is accompanied by the production of large charges of electricity. Some of the dust particles have positive charges, and others are negative.

Either one set of charged particles settles rapidly, leaving the other set in the air, or else a charge is given to the air itself. (The experiments do not show which of these views is correct.) This charge is retained by the air for some considerable time.

The sign of the charge remaining in the air depends upon the nature of the material used. Finely divided silica gives to the air a negative charge and coal gives a positive charge.

The total electrification of dust and air is zero. The friction between particles of similar material apparently produces sufficient electrification to account for the charges observed.

An unweighable amount of dust can produce an easily measurable charge.

In *Nature*, of Feb. 12, 1914, the same author wrote, under the heading of A Possible Cause of Explosions in Coal Mines:

If a cloud of dry dust is suddenly projected against an insulated conductor, the latter becomes charged with electricity to such a potential that sparks several centimeters in length may be obtained. It therefore appears possible that a cloud of dust raised by a sudden fall, or other means, in a mine might charge up an insulated conductor to such an extent that a spark could pass to an earthed conductor near it, and thus fire an explosive mixture of gases if this were present. . . . If, then, such a combination should occur as that of a sudden cloud of coal or perhaps other dust, an insulated conductor, an earth-connected conductor near it, and an explosive mixture of gases, it is not inconceivable that an explosion might follow.

The following allusions are extracted from the paper of Doctor Thornton, to which I have referred:

A very full report on gaseous combustion was given by Prof. W. A. Bone at the Sheffield meeting of the British Association, in the discussion upon which Sir J. J. Thompson called attention to the possible influence of electrons in preparing the way for an explosion wave ionising the gas. . . . These observations, if they do not decide the ionic origin of gaseous explosions in general, prove that ionisation and explosion are intimately connected.

The higher the voltage the less the current required. . . . Since hydrogen is the most easily ionized of all gaseous molecules, it is at least conceivable that if the effect is due to ionization the ignition of the complex molecule of combustible gas is started by the ionization of its hydrogen atoms; and that, in its disintegration, the first compounds formed are those of hydrogen and oxygen. This is in agreement with

Prof. H. B. Dixon's conclusion that it is during the "pre-flame" period of ignition which precedes the true explosion that water vapor influences the rate of propagation.

Doctor Thornton then concludes as follows:

It would appear to be probable, from the great differences, in magnitude and type, between continuous and alternating-current ignition, that some kind of ionization precedes combustion, for the evidence is strong that a relation between electrification and chemical change, not unlike that of ordinary ionization, occurs on ignition, caused possibly by the violent collisions, which must occur in the gas in contact with high-temperature sparks. . . . Since it is probable that all three modes of molecular motion, translation, rotation and vibration have part in the process of ionization by collision, the influence of temperature, which depends only upon the translational energy, may be in certain cases of secondary importance.

I trust that these extracts will prove of interest in this connection.

JAMES ASHWORTH,
Mining Engineer.

Vancouver, B. C., Canada.

[Personally, we have, for a long time, held the opinion that there was not only a possibility but a strong probability that the high-potential currents so frequently conducted into coal mines for power purposes, exerted an electrifying influence on the mine air that tended to increase its explosive condition. Dr. Holmes promised, two years ago, to have the Bureau investigate the matter.—Ed.]

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

The **natural division** of the main air current of 85,240 cu.ft. between the three primary splits A, B, C; and the two secondary splits C₁, C₂, in the last example, is calculated first for the primary division, and then for the secondary, as follows:

	Part Pressure Potentials	Natural Required (cu. ft. per min.)
Primary splits,	$X_a = 1.837$	$q_a = \frac{1.837}{5.617} \times 85,240 = 27,880$
	$X_b = 1.623$	$q_b = \frac{1.623}{5.618} \times 85,240 = 24,630$
	$X_{co} = 2.157$	$q_c = \frac{2.157}{5.617} \times 85,240 = 32,730$
Totals,	$\Sigma X_p = 5.617$	$Q = 85,240$
Airway,	$X_c = 2.629$	(Tandem) 32,730
Secondary splits,	$X_{c1} = 1.697$	$q_{c1} = \frac{1.697}{3.775} \times 32,730 = 14,710$
	$X_{c2} = 2.078$	$q_{c2} = \frac{2.078}{3.775} \times 32,730 = 18,020$
Sum of split potentials,	3.775	

The natural pressures are then calculated for the required circulation of air in each split. The highest pressure of the secondary splits determines the **secondary pressure**, which must be added to the natural pressure of the tandem airway, to obtain the effective primary pressure for Split C. Finally, the highest primary pressure determines the **primary pressure**, which is the pressure for the entire split circulation. The process is as follows:

Secondary pressures,	$p = k \left(\frac{q}{X_p} \right)^2$; $p_{c1} = 0.00000002 \left(\frac{25,000}{1.697} \right)^2 = 4.341$ lb. per sq. ft.
	$p_{c2} = 0.00000002 \left(\frac{15,000}{2.078} \right)^2 = 1.042$ lb. per sq. ft.
Tandem,	$p_c = 0.00000002 \left(\frac{40,000}{2.629} \right)^2 = 4.630$ lb. per sq. ft.
Primary pressures,	$p_{co} = p_{c1} + p_c = 8.971$ lb. per sq. ft.
	$p_a = 0.00000002 \left(\frac{29,240}{1.837} \right)^2 = 5.067$ lb. per sq. ft.
	$p_b = 0.00000002 \left(\frac{16,000}{1.623} \right)^2 = 1.944$ lb. per sq. ft.
Horsepower,	$H = \frac{Qp}{33,000}$; $H = \frac{85,240 \times 8.971}{33,000} = 23.17$ hp.

The secondary pressure, as determined by the highest natural pressure in those splits, is that in Split C₁, which is 4.341 lb. per sq. ft. Likewise the primary pressure (the highest of those splits) is that of the tandem split C₀, which is 8.971 lb. per sq. ft. These pressures are indicated above by the heavy type.

The Coal Age Pocket Book

Regulators—The difference between the secondary pressure and the natural pressure in any secondary split is the pressure due to the regulator or the **regulator pressure** for that split. The same is true for primary splits.

The pressures due to the regulators required in Splits A, B and C₂, in order to accomplish the required distribution of air are, therefore, as follows:

Split A,	$8.971 - 5.067 = 3.904$ lb. per sq. ft. (0.751 in. w.g.)
Split B,	$8.971 - 1.944 = 7.027$ lb. per sq. ft. (1.351 in. w.g.)
Split C ₂ ,	$4.341 - 1.042 = 3.299$ lb. per sq. ft. (0.634 in. w.g.)
The necessary area of opening in a regulator to pass the required quantity of air, under the given water gage is calculated as follows:	
Box regulator,	$A = \frac{0.0004 q}{\sqrt{w.g.}}$; $A_a = \frac{0.0004 \times 29,240}{\sqrt{0.751}} = 13.5$ sq. ft.
	$A_b = \frac{0.0004 \times 16,000}{\sqrt{1.351}} = 5.5$ sq. ft.
	$A_{c2} = \frac{0.0004 \times 15,000}{\sqrt{0.634}} = 7.5$ sq. ft.

If door regulators are used the openings have the following areas:

Door regulator,	$A = \frac{0.00025 q}{\sqrt{w.g.}}$; $A_a = \frac{0.00025 \times 29,140}{\sqrt{0.751}} = 8.4$ sq. ft.
	$A_b = \frac{0.00025 \times 16,000}{\sqrt{1.351}} = 3.4$ sq. ft.
	$A_{c2} = \frac{0.00025 \times 15,000}{\sqrt{0.634}} = 4.7$ sq. ft.

The results of making the secondary split in Primary C may therefore be summarized as follows:

	Natural (No Regulators)	Required (Reg's)
Split A (cu. ft. p. m.)	29,720	27,880
Split B	26,260	24,630
Split C	19,020	(32,730) (40,000)
Split C ₁	14,710	25,000
Split C ₂	18,020	15,000
Totals	75,000	85,240
Pressure (lb. p. sq. ft.)	5.2	4.6
Water gage (in.)	1	0.88
Horsepower on air (hp.)	11.9	23.17

The above comparison shows: (1) The increase in the quantity of air in circulation and the decrease in the unit pressure and water gage, for the same power on the air, caused by making a small secondary split, in one of the original primaries. (2) The large increase of power on the air and pressure and water gage necessary to make the required distribution of air, in this case.

Inquiries of General Interest

Study Question--Ventilation

I have been comparing the ventilation question answered in COAL AGE, May 30, p. 900, with Question 962, on p. 196, of the book, "Examination Questions for Certificates of Competency." I do not understand why these two questions cannot be worked alike.

I have always understood that, in splitting air currents, the quantity of air in circulation would be increased directly as the number of splits into which the main air current was divided. This is a much shorter rule to apply; but, in this case, it would give, for the three splits, only $3 \times 75,000 = 225,000$ cu.ft. per min. as the total quantity of air in circulation, instead of 233,710 cu.ft. per min., which is the answer given in COAL AGE, p. 900. I would very much appreciate an explanation of the difference, if any, between these two examples.

FRED VINTON, Mine Foreman,
Penn-Mary Coal Co.

Heilwood, Penn.

The questions referred to by correspondent are as follows:

(*Coal Age*, May 30, p. 900)

Suppose that a given power circulates 75,000 cu.ft. of air per minute through a certain airway, in a continuous current; and it is decided to divide the air into three splits as follows:

Split A,	6 × 6 ft., 5000 ft. long;
Split B,	5 × 6 ft., 4500 ft. long;
Split C,	6 × 7 ft., 4000 ft. long.

Calculate the quantity of air that will pass in each split, assuming that the power on the air remains unchanged.

(*Examination Questions for Certificates of Competency*, p. 196)

Ques. 962—A current of 100,000 cu.ft. of air passes through an airway 6x5 ft. in sectional area, and 10,000 ft. long, which is divided into three splits as follows: Split A is 6x6 ft. in section, 2000 ft. long; split B is 6x5 ft. in section, 4000 ft. long, and split C is 6x4 ft. in section, 6000 ft. long. What quantity of air will pass in each split while the pressure remains the same?

It is readily seen that the two questions are quite different. The first gives the quantity of air circulated by a certain power, in a continuous current, in three airways, the sizes and lengths of which are given. This question asks for the quantity of air that the same power will circulate in these three airways, each being ventilated by a separate split or current.

The second question is somewhat ambiguous, as it states a current of 100,000 cu.ft. per min. passes through an airway 6x5 ft., 10,000 ft. long, which is divided into three splits of given size and length. The question asks, "What quantity of air will pass in each split under a constant pressure?" The answer to this question assumes (whether rightly or wrongly can only be judged) that "the main airway may be ignored . . . and that the pressure is the same at the mouth of each of these splits."

This is probably the only intelligible construction that can be put upon the question as it reads. It is therefore a simple question in the natural division of an air

current between three splits of different size and length. This question, however, differs radically from the preceding question where it is necessary, first, to calculate the power producing the circulation in a continuous current and, then, find the distribution of the air between the three airways given, in which the circulation is produced by the *same power* as when the air was traveling in the continuous current first mentioned.

The points of similarity in the two questions are that each considers the natural distribution of a specified volume of air between three airways or splits of given size and length; but there the similarity ends.

The points of difference are, the first question considers a constant power, which produces a given quantity of air in a continuous current, in the airways; and this power determines the total quantity circulated in the splits. In the second question, the total circulation in the splits is given and does not need to be calculated as in the first question. Both questions consider a constant pressure as acting on all the splits alike.

The rule given by correspondent, making the quantity of air in circulation vary directly as the number of splits, applies only to *equal* splits and when the *power* producing the circulation remains constant. For example, assuming a constant power on the air produces 10,000 cu.ft. per min. in a certain airway or mine, in a continuous current, if this current be divided into two, three or four equal splits the total quantity of air in circulation will be increased two, three or four times. In other words, the circulation will vary as the number of splits. The pressure, however, in this case, will vary *inversely* as the number of splits. Thus, for the first division (two splits) the pressure will be one-half of the original pressure; for three splits, one-third and for four splits, one-fourth of the pressure due to a continuous current, the power remaining constant.

On the other hand, if it is assumed that the *pressure* is to be maintained constant, by increasing the power when the current is divided, the quantity of air in circulation will vary as the square root of the cube of the number of splits; or, expressed as a formula,

$$Q \text{ varies as } \sqrt{a^3}, \text{ or a } \sqrt{a}$$

For example, if 10,000 cu.ft. of air per minute is circulated in a single current, in a mine, by a certain pressure, when the air is divided into two equal splits the same pressure will circulate $2\sqrt{2} \times 10,000 =$ say, 28,200 cu.ft. per min. To do this, however, that is to maintain a constant pressure when the air current is divided, the power must be increased in the same proportion; or, in this case, the power must be increased 2.82 times, in order to maintain a constant pressure when the air is divided into two equal splits.

Since the rule referred to by correspondent only applies in the case of equal splits, that rule could not be applied in answer to the question, COAL AGE, p. 900, as the splits are of different size and length and therefore unequal.

Examination Questions

Montana Mine-Foremen's and Firebosses' Examination

Ques.—Of what is atmospheric air composed?

Ans.—The air when pure is composed mainly of nitrogen and oxygen gases, in the proportion, by volume, of one part oxygen to four parts nitrogen. Beside these gases, there is a small proportion of carbon dioxide, commonly amounting to four parts of this gas in ten thousand parts of air, or 0.04 per cent.

Ques.—What relation has whitedamp to air, as regards its specific gravity?

Ans.—Whitedamp, or carbon monoxide (CO) is lighter than air, its specific gravity being 0.967.

Ques.—Give the names, chemical symbols and compositions of the different gases met with in coal mines.

Ans.—This question is fully answered in COAL AGE, July 4, p. 40.

Ques.—How are gases caused to expand from the strata and, at times, to overflow the workings of a mine?

Ans.—The gases occluded in the strata exist under a greater or less pressure, which drives them out into the workings of the mine as these are pushed forward, where they expand under the lesser pressure of the atmosphere. Where the pressure is very great, the occluded gases are often driven out in large volume, filling the airways and overflowing the workings more rapidly than they are carried away by the air current.

Ques.—Explain the principle of the Davy safety lamp.

Ans.—In the Davy lamp, the oil vessel is surmounted by a wire-gauze chimney, within which the flame of the lamp burns. The gas-charged air surrounding the lamp enters through the mesh of the gauze and burns within the chimney, but the burning gas is extinguished as it passes out through the upper portion of the chimney. The fine wire mesh divides the gas into tiny streams and the cool metal reduces the temperature of these streamlets of gas passing through the mesh and in proximity to it, below the point of ignition whereby the flame is extinguished. The accompanying figure illustrates the fact that it is impossible for a flame to touch a cool metal surface, the heat of the flame being absorbed by the metal so that the temperature is reduced below that required for combustion. It is this absorption of heat that causes the extinction of the flame in proximity to the metal.



Ques.—What is firedamp?

Ans.—The term "firedamp," as its name implies, describes any inflammable or explosive mixture of gas and air. Any of the inflammable or explosive mine gases mixed with air in proper proportion constitutes a firedamp mixture.

Ques.—How would you remove gas from gobs?

Ans.—If there is a considerable accumulation of gas

in the gob, its removal should be undertaken only when the men are out of the mine. In any case, all persons should be withdrawn from the return of the air current in that district. The return airway should then be safeguarded by competent persons to prevent anyone from entering the return current. The air current should then be deflected and made to pass through the gob, in such a manner as to clear away the gas accumulated therein. Only safety lamps should be used, and the work should be performed from the intake side. Care must be taken to protect the lamps from any sudden outrush of gas, due to a fall of roof in the gob. The details of the work can only be determined by a knowledge of the conditions.

Ques.—Are there any conditions under which it would be unsafe to use a safety lamp? If so, name them.

Ans.—A safety lamp is only safe when handled by a competent and experienced person. Too long an exposure to gas; a heated or dirty gauze; a fall of the lamp or any sudden movement; a high velocity of the air current, or a heavy concussion of the mine air may cause the flame to pass through the mesh of the gauze and ignite the gas outside of the lamp. Any defect in the gauze chimney or neglect in putting the lamp together may likewise cause the failure of the lamp in the presence of gas. It is unsafe to approach a lamp to a strong feeder of gas; or to swing the lamp or tilt it so that the flame strikes against the gauze.

Ques.—If you detected gas in one or more working places, what would you do to protect and secure the safety of the men working in the adjoining places?

Ans.—The men working in the adjoining places should be promptly notified to extinguish their lamps and withdraw from the face. This should be done as quietly as possible, in order to avoid disturbing the gas before suitable provision has been made for its removal. All of the men on the return air should then be notified to withdraw from their places, in case the quantity of gas accumulated is considerable, before attempting to dislodge the gas.

Ques.—How would you approach a place with a safety lamp, when you expected to find gas; and, if there, how would the gas act on your lamp, and what would you immediately do upon discovering it?

Ans.—Move slowly and with caution; raise the lamp toward the roof each few feet of advance and observe carefully any signs of the presence of gas, as indicated by the lengthening of the flame, its increased size or brightness, its unsteady or wavy motion and the appearance of a cap surmounting the flame of the lamp. It may be assumed, from the reading of the question, that no men are working at the face. All approaches to the place should be safeguarded by danger signals and fenced off to prevent anyone from entering the place unwarned. Further action will depend on the quantity of gas accumulated. If this is considerable, steps should be taken to prevent anyone from entering or working in that section of the mine until the danger is removed, which should be done at once.

Coal and Coke News

Washington, D. C.

The Interstate Commerce Commission has handed down a decision in the case of Investigation and suspension docket No. 321 dealing with coal rates from Virginia mines. In this case, the following conclusions are reached:

1. The rates on coal from the mines in the St. Charles, Va., group to points north of the Ohio River within 400 miles from St. Charles should not exceed the rates from the Middlesboro-Jellico group to said destinations by more than 10 cents per ton; beyond that the differential should decrease not less than 1 cent for each additional 100 miles.
2. The rates on coal from the mines in the Appalachia group and the mines at Benham, Ky., should not exceed the rates from the Middlesboro-Jellico group to points north of the Ohio River by greater amounts than the present differentials, provided that the differentials of Appalachia over Middlesboro-Jellico should in no case be less than the differentials of St. Charles over Middlesboro-Jellico.
3. The prescribed differentials being maximum, the carriers are at liberty to establish smaller ones whenever commercial conditions may so require.
4. Respondents required to cancel rates exceeding those prescribed in the report, but suspension order vacated as to all other rates named in the tariff under suspension.

The case as originally brought concerned the rates on coal to points north of the Ohio River from the St. Charles or Black Mountain group of mines and the Appalachia group in southwestern Virginia the mines at Benham, Ky., and the Middlesboro-Jellico group in southwestern Kentucky and northern Tennessee all of which are served by the Louisville & Nashville Ry., and the relationship between them.

The mines in the Middlesboro-Jellico district take the same rates to points north of the Ohio River. To points south of the river this group is subdivided, the mines nearer the destinations taking lower rates than those more distant. Effective Nov. 22, 1904, rates were published by the Louisville & Nashville R.R. Co. from the St. Charles district to destinations south of the Ohio River. These were 20 cents higher than the rates in effect from Middlesboro. Effective Mar. 19, 1906, rates were established from the St. Charles district to destinations south of the Ohio River which were 5 cents above the rates from mines at and near La Follette, Tenn., 10 cents above the rates from mines at and near Middlesboro, Ky., and Jellico, Tenn., and 20 cents above the rates from mines near Sinks, Ky.

This relationship has been maintained to the present. Prior to Apr. 1, 1906, no through joint rates were published from the St. Charles district to points north of the Ohio River. In a tariff effective that date the St. Charles district was placed on the Middlesboro-Jellico basis to points north of the Ohio and has ever since been maintained upon that basis. The rates from the Appalachia and Benham mines to the same destinations are from 10 to 25 cents per ton higher than the rates from the St. Charles and Middlesboro-Jellico mines.

In the tariff under suspension the rates from the St. Charles mines to a large number of destinations north of the Ohio are from 1 to 30 cents higher than from the Middlesboro-Jellico group. To a large number of other destinations the St. Charles mines are maintained upon the Middlesboro-Jellico basis. Wherever a differential is established between the rates from the St. Charles and the Middlesboro-Jellico mines it is effected by a reduction in the rates from the latter group of mines. The tariff also contains some reductions in rates from the St. Charles and Appalachia mines, but wherever these occur greater reductions are made in rates to the same destinations from the Middlesboro-Jellico group.

In the tariff under suspension the rates from the Appalachia district, with few exceptions, bear the same relation to the rates from the St. Charles mines as in the tariff at present in effect, but the spread between the Appalachia and the Middlesboro-Jellico rates is increased wherever a differential is established between the latter group and the St. Charles mines.

The rates from Benham, while in many instances the same as those from the Appalachia mines, are in a great number of cases fixed at varying amounts below the Appalachia mines, and are in all cases a little higher than the rates from the Middlesboro-Jellico group. Whatever changes have been made in the Benham rates are reductions and in some instances they are below the rates proposed from the St. Charles mines in the tariff under suspension.

The suspended tariff names over 8000 rates, of which 1362 are to points to which none are at present in effect from the mines herein involved. In only a few instances does it contain rate increases. These, it was testified, were unintentional, and were withdrawn at the opening of the hearing.

The Bureau of Mines Appropriation

Appropriations for the Bureau of Mines for the coming years as enacted into law in their finally revised form are as follows:

For general expenses, including pay of the director and necessary assistants, clerks, and other employees in the office at Washington, D. C., and in the field, and every other expense requisite for and incident to the general work of the bureau, and to be expended under the direction of the Secretary of the Interior, \$70,000.

For investigation as to the causes of mine explosions, methods of mining, especially in relation to the safety of miners, the appliances best adapted to prevent accidents, the possible improvement of conditions under which mining operations are carried on, the use of explosives and electricity, the prevention of accidents, and other inquiries and technologic investigations pertinent to the mining industry, \$347,000.

For purchase of mine-rescue, first-aid, and fire-fighting equipment and supplies for use in the operation of mine-rescue cars and stations, \$30,000.

For purchase of steam and electric equipment for supplying light and power to the testing plant of the Bureau of Mines at Pittsburgh, Penn., \$10,000.

For investigation of mineral fuels and unfinished mineral products belonging to or for the use of the United States, with a view to their most efficient mining, preparation, treatment, and use, including personal services in the bureau at Washington, D. C., not in excess of the number and total compensation of those so employed during the fiscal year nineteen hundred and thirteen, \$135,000.

For inquiries and scientific and technologic investigations concerning the mining, preparation, treatment, and utilization of ores and other mineral substances, with a view to improving health conditions and increasing safety, efficiency, economic development, and conserving resources through the prevention of waste in the mining, quarrying, metallurgical, and other mineral industries; to inquire into the economic conditions affecting these industries: Provided, That no part thereof may be used for investigation in behalf of any private party, nor shall any part thereof be used for work authorized or required by law to be done by any other branch of the public service, \$100,000.

Not exceeding twenty per centum of the foregoing sum and not exceeding ten per centum of the sum for investigation as to causes of mine explosions may be used during the fiscal year 1915 for personal services in the District of Columbia; and for the fiscal year 1916, and annually thereafter estimates shall be submitted specifically for all personal services required permanently and entirely in the Bureau of Mines at Washington, D. C., and previously paid from lump sum or general appropriations.

For inquiries and investigations concerning the mining, preparation, treatment, and utilization of petroleum and natural gas, with a view to economic development, and conserving resources through the prevention of waste; to inquire into the economic conditions affecting the industry, \$25,000.

For one mine inspector for duty in Alaska, \$3000;

For per diem, subject to such rules and regulations as the Secretary of the Interior may prescribe, in lieu of subsistence at a rate not exceeding \$5 per day when absent on official business from his designated headquarters, and for actual necessary traveling expenses of said inspector, \$2500;

For technical and scientific books and publications and books of reference, including payment in advance for subscriptions to publications, \$1500;

For purchase or lease of the necessary land, where and under such conditions as the Secretary of the Interior may direct, for the headquarters of five mine rescue cars and for the construction of the necessary railway sidings on the same, \$1000: Provided, That the Secretary of the Interior is authorized to accept any suitable land or lands that may be donated for said purpose;

In all, for the Bureau of Mines, \$725,000.

Persons employed during the fiscal year 1915 in field work, outside of the District of Columbia, under the Bureau of Mines, may be detailed temporarily for service at Washington, D. C., for purposes only of consultation or in connection with the preparation of results of their field work; all persons so detailed shall be paid in addition to their regular compensation only their actual traveling expenses in going to and returning therefrom; and all details made hereunder, and the purposes of each, during the fiscal year shall be reported, in the annual estimates of appropriations, to the Sixty-fourth Congress at its first regular session.

HARRISBURG, PENN.

While no notice as yet has been received at the capitol, it is believed that the anthracite coal companies to whom bills for the coal tax were sent a short time ago will appeal to the Dauphin County Court from the settlement of the Auditor General on the taxes. The question of the constitutionality

of the act is now before the Dauphin County Court, and, pending a decision, the companies will probably take the matter into court.

Mining Board Holds Examinations

In open defiance to James E. Roderick, chief of the State Department of Mines, the Mine Inspectors' Examining Board of Luzerne and Carbon Counties, on July 7, conducted examinations at Wilkes-Barre and five candidates presented themselves. Chief Roderick notified the board members that he would hold up their expenses if the examinations were held, claiming it was a waste of the taxpayers' money to hold examinations because there are no vacancies to fill. The board took the position that it was necessary to qualify candidates in order that vacancies may be filled in the event of death, resignation or removal from office.

It is contended that heretofore it has been the custom for the board to pass just enough men to give each district one candidate. There has been some complaint against this method. The present board has set itself up in opposition to the old plan. The board members declare they will qualify all men who are able to pass the examinations and cause the office of mine inspector to be sought by more than one candidate at each election.

Canal Commission Gets Busy

After a four days' session covering all the details in connection with the work of a field survey, the Lake Erie & Ohio River Canal Board, recently appointed by Governor John K. Tener, adjourned on July 9. The members of the board—President William A. Magee, Col. Thomas W. Seymour, United States Army, of Washington; Thomas P. Sloan, of Lock No. 4; James A. Chambers and A. S. McSwigan, of Pittsburgh—were practically in continuous session during the four days. During the meeting it was decided to open offices or headquarters for the board in the Farmers' Bank Building, Pittsburgh, where there will be information and literature bearing on the canal for public use. These offices will be opened on Aug. 1. Charles L. Lancaster was elected secretary of the commission.

The work of surveying the route probably will begin before the end of the month. Two surveying corps, or field parties, have been organized and as soon as their equipment is received they will start to work. One corps will begin at the mouth of the Beaver River and the other at the mouth of the Mahoning. George M. Lehman, who has been identified for many years with canal work, was elected chief engineer. The survey work probably will be completed by January.

The canal commissioners, on July 7, inspected the locks and dams of the Ohio River between Pittsburgh and the mouth of the Beaver River.

PENNSYLVANIA

Anthracite

Archbald—During a heavy thunderstorm, on July 10, a small dam overflowed into White Oak Brook. This in turn overflowed, entering a hole caused by a mine or cave and filled the upper vein of the White Oak colliery, then passed through another cave hole into the Dunmore vein, where 75 men were working. Before the men could get out of the mine about 25 had to wade neck deep in water. One miner, named Bushlaw, was swept into the airway, where the water was escaping to the outside and was flushed under ground a quarter of mile to the opening in a steep bank 600 ft. above the Delaware & Hudson tracks. He was uninjured.

Hazleton—The value of safety appliances on mine shaft cages was demonstrated at Hazleton Shaft No. 40 of the Lehigh Valley Coal Co., on July 9, when the rope on the cage at the shaft broke while a coal car was being hoisted. The cage began to drop, but had only descended a short distance when the safety clutches acted and the cage was held stationary. The accident brings to mind the catastrophe that occurred at Mary D colliery several weeks ago, when six miners were killed when a mine cage was precipitated to the bottom of the shaft. While no one was in danger in the present instance, the value of the safety clutches was proven and a serious smash-up was avoided.

Klines Grove—When Anson Rabuck, 14 years old, fell into the Susquehanna River, on July 7, he did not reappear. Three hundred feet down stream a coal dredge was working and in a few minutes the little fellow was deposited upon the screen apparently dead. A half dozen men took turns at using "first aid" methods, and after a half hour's work signs of life were perceived.

Bituminous

Marianna—Charged with having violated the bituminous mining laws while at work in the Rachel mine of the Pittsburgh-Buffalo Coal Co., John Gladinkoff, alias check No. 90, was placed under arrest, on July 10, and lodged in jail in de-

fault of bail. Gladinkoff is charged by Mine Inspector C. P. Byrne with having violated the mining laws on numerous occasions by not keeping a bore hole 3 ft. ahead of the face on which he was working. He is also alleged to have been warned repeatedly by the mine officials.

Waynesburg—A deed recording the sale of about 8000 acres of coal comprising 87 tracts in Perry and Wayne Townships, and said to involve approximately \$5,000,000 was filed recently with the Recorder of Deeds at Uniontown. The deed is dated June 6, 1914, and conveys from J. V. Thompson of Uniontown and 45 others certain coal lands to the Green County Coal Co., the purchase price mentioned being \$1 and other good and sufficient considerations. At the same time a letter of incorporation was filed for the Green County Coal Co., in which J. A. Larger, L. R. Martin and R. T. Russel, all of Pittsburgh, are named as directors and stockholders. It is said that the transfer of the tract from Mr. Thompson and others to the Green County Coal Co. is only a reorganization and incorporation of the owners of the land and that there was no real sale. On July 10 the Green County Coal Co. paid the state \$5600 as state bonus on an increase of stock from \$5000 to \$1,632,000.

Uniontown—Deeds have been recorded in this city, formally turning over to the American Manganese Co. the holdings of the Dunbar Furnace Co. in Fayette County. More than 7000 acres of coal land is included in the transfer. The deeds were first turned over by the L. & R. Wister Co., the Dunbar Coal & Coke Co. and Samuel Dickson, all interested in the Furnace company, to William Selfridge, trustee, who in turn transferred them to the Manganese company. By mutual agreement the purchaser becomes the owner of the properties of the Dunbar Furnace Co., of Samuel Dickson, except store property, and the Dunbar Coal & Coke Co. at Dunbar, the Cuyuna Duluth Iron Co. and the Cuyuna Mille-Lacs Iron Co. of Minnesota.

WEST VIRGINIA

Charleston—The mines at Boomer, Hughestown, Eureka (Montgomery) and Winfrede are exceptions to the general statement that the men in the Kanawha district have gone back to work under a temporary arrangement, including a modified check-off system, pending arbitration of difficulties by a board appointed by the two sides. The management of the Boomer and Winfrede mines refuses to resume work under the check-off, or under any terms except those existing before the strike, while at Montgomery the miners refuse to go back to work until the whole controversy is settled. D. C. Kennedy and O. O. Griffith, selected by the men and the operators, respectively, to choose a third man as arbitrator and then fix tonnage rates and wages, have not yet chosen the third member of the board.

The fact that the death of five men at the mine of the Sycamore Coal Co. was due to the destruction of the fan house by fire has moved Earl Henry, chief of the Mining Department, to advocate the construction of fan-houses of fire-proof material. A bill to this effect will be introduced in the next West Virginia legislature, with statistics showing the number of deaths which have been due to burning fan houses in coal mines in the state.

Wellsburg—On the morning of July 10 a heavy steel cable attached to three loaded mine cars on the incline of Mine No. 3 of the Pittsburgh & West Virginia Coal Co. broke and the cars ran down the incline, almost totally demolishing the tippie and causing damage estimated at about \$2000. No one was injured except one of the tippemen, who, seeing the trip coming, jumped to the ground, sustaining injuries to his right leg. To have remained on the tippie would have meant almost certain death.

KENTUCKY

Hazard—The Ashless Coal Co., preparing for an extensive operation three miles above Hazard has induced the Lexington & Eastern R.R. Co. to open a station known as Ashless, where much other business will originate. The company will be ready to begin shipping coal in a short time.

Frankfort—Purchasers of Kentucky coal lands are warned by J. B. Hoeling, director of the State Geological Survey that "large areas have been purchased in Kentucky in the last few years, apparently just because they were included in the boundaries of the coal measures, and with the idea that all coal lands must be valuable, the proving up of the land often following the purchase instead of preceding it. The limits of the coal measures are easily marked on the map, but it does not follow that all the territory within these limits is productive or of value."

Whitley City—The Glen Mary Coal Co., Glen Mary, Ky., and the Eagle Coal Co., on Barren Fork, have gone into receivers' hands. New operations, however, are preventing what otherwise might have been termed a depression.

OHIO

Martins Ferry—The announcement is made that the new Johnson mine at West Wheeling will be started soon with a complete equipment to comply with the mine-run law in Ohio.

Athens—A number of companies operating mines in the Sunday Creek and Hocking Valleys are to be prosecuted by the Ohio game warden's office for the pollution of the Hocking River to such an extent as to kill thousands of fish. Several creeks tributary to the river were found by a deputy game warden to be badly polluted by water pumped out of the mines, which it is said could easily be purified by limestone filter beds before being allowed to flow into the streams.

Columbus—Operators in the eastern Ohio and Cambridge districts and some of those in the Bergholz district have refused to treat with the striking miners under the new scale which has been agreed upon, and declare that they will not open their mines under it, asserting that there is no profit in operating under the new figures.

The wage scale covering in all 22 mines in the Cambridge district in Ohio was signed by A. A. Augustus, representing the operators' and miners' officials in the office of Governor Cox, of Ohio, late July 11. The scale is the same as agreed upon by the operators and miners in the Hocking Valley, Pomeroy, Jackson, and a portion of the Crookville districts. It provides for 67.6c. per ton for pick-mined coal, and 47c. per ton for machine-mined coal, on the mine-run basis. As soon as the details and local conditions can be adjusted about 6000 men will return to work.

INDIANA

Terre Haute—The Otter Creek Coal Co. has brought suit against the Georgia Life Insurance Co. for \$3500 on account of the latter firm's failure to pay a judgment for \$1500 obtained against the coal company by an injured miner. The company carries accident policies on its miners.

Linton—The tests now being conducted on a new machine for mining coal may result in a change in the scale of wages for machine mining. A committee of miners and operators are watching the trials. The machine is operated from a turret and coal may be cut both above and below, thus increasing the output.

ILLINOIS

Marquette—Negotiations are under way for the sale of the Marquette coal mine. Reports are to the effect that a large boating company, with headquarters in Chicago, desires control of the mine and may purchase it direct. It is expected that the new firm will ship coal from this mine by water routes during the navigation season whenever this course is found cheaper and more expeditious than by rail.

Streator—The C. W. & V. Coal Co. recently closed permanently its No. 2 Mine. Two hundred miners were thereby thrown out of employment. This mine has been operated 10 years in the upper vein and 10 in the third vein, but the latter operations were not profitable, and there is a considerable quantity of coal still left in the mine.

Springfield—According to Duncan McDonald, secretary-treasurer of the Illinois Mine Workers, a desperate condition exists in the coal mining industry. He states that 40,000 out of 90,000 members of the organization in the state are out of work because of overdoing of the coal industry of Illinois. He further stated that "many of these miners are on the verge of starvation, as there is not enough money in the relief fund to supply them all. Eighteen mining companies failed last year. Too many mines are being opened and there should be a law similar to that in Germany restricting the opening of new mines."

MISSOURI

Kansas City—The Central Coal & Coke Co. has secured the contract for providing coal for the fire and water board for the next year. The contract amounts to about \$80,000.

KANSAS

Franklin—Mines Nos. 15 and 16 of the Western Coal & Mining Co. were tied up for a couple of days recently by a strike of the 500 miners employed. Complaint over the alleged bullying of a pit boss caused the walkout in No. 15 and complaints of cagers, that in No. 16. Both were adjusted and work was resumed.

Pittsburg—Several mines which depend on electricity for power were out of commission for several days recently as the result of a severe electrical storm. Several mines of the Cherokee & Pittsburg Coal & Mining Co. were included in those which shut down for repairs. The wash house at mine No. 47 of the Central Coal & Coke Co. was fired by lightning and destroyed.

PERSONALS

H. D. Mason, Jr., was recently appointed assistant engineer to J. W. Paul, with headquarters in Pittsburgh. He has not, as stated in our issue of July 4, been appointed engineer-in-charge.

George M. Jones, head of the G. M. Jones Coal Co., went to Bellaire, O., this week to look after the interests of his company in that section. This concern owns mines in the disturbed section of Belmont County, and their safety has been threatened.

Joseph Cummings, of Birmingham, Ala., a practical coke burner, has devised a movable coke oven draft stack to be used on beehive ovens, which it is claimed will materially raise the output. Mr. Cummings recently made some tests of this patent in West Virginia, getting some very fine results.

OBITUARY

George B. Markle, a coal operator and leader in local political circles, died at the hospital in Hazleton, Penn., on July 11. Two days prior to his death he was operated upon for hernia and failed to rally.

Mr. Markle was born in Hazleton 62 years ago. He was educated in the local schools, later entering a military academy at Plains, N. Y. He graduated from Lafayette College in 1878. He was the founder of the George B. Markle Coal Co., operator of the Geddo collieries. Besides being prominent in the local political circles, he was also an active member of the Hazleton Board of Trade and the Hazleton Country Club.

Thomas Prosser, for many years a prominent coal operator of Lisbon, Ohio, and one of the organizers of the Card & Prosser Coal Co., with headquarters in Cleveland, died at his home in Lisbon, July 10. Death followed a stroke of paralysis.

Mr. Prosser was born in Mineral Ridge July 6, 1864. After the organization of the Card & Prosser company he was made general manager of all the properties, including the mines at West Pittsburgh, the Peerless mine at Washingtonville, the Wadsworth, Massillon, Saratoga, Coleman and Lisbon mines. He held this position until six months ago, when he retired on account of ill health.

CONSTRUCTION NEWS

Louisa, Ky.—The Louisa Coal Co. is electrifying its Torchlight mine, the installation being made by F. H. Hinman, of Flint, Mich.

Mineral, Kan.—John Mayer, a well known coal operator, is reported to be ready to sink an operation in the Mineral field, as soon as the Empire District Electric Co., of Joplin, Mo., runs a transmission line to Mineral.

Scarbro, W. Va.—The Link-Belt Co., of Chicago, has just started the erection of a large steel tippie of the shaft type for the New River Co. at Scarbro. This structure replaces a wooden tippie which was burned down a short time ago.

Red Jacket, W. Va.—The Link-Belt Co., of Chicago, was recently awarded a contract from the Red Jacket Consolidated Coal & Coke Co. for a complete shaking screen tippie, consisting of picking tables, shaking screens, loading chutes, etc.

Wheeling, W. Va.—The Semet-Solvey Coke Co. has had a force of men at work for some time making repairs to a number of its coke ovens. Practically all the ovens will undergo needed repairs, which will require about a month for completion.

Connellsville, Penn.—Negotiations are in progress between coal operators of the Indian Creek valley and the West Penn Electric Co., which will probably mean the electrification of the valley shortly. It is planned to have this extension complete by autumn.

Williamsburg, Ky.—Electrical equipment will be installed by the East Tennessee Coal Co., H. J. Davis, Knoxville, Tenn., president, at its new operations in Kentucky, where the out-

put, it is estimated, will be 1000 tons daily. The date when bids will be opened on the electrical equipment has not been fixed.

Whitesburg, Ky.—The Mineral Development Co., a Philadelphia corporation, is said to have engineers at work on the preliminary surveys for a considerable coal development on Colly Creek, near this city, which is to be started, according to an announcement within 60 days. About 1000 acres will be developed.

Pittsburgh, Penn.—The Pittsburgh Coal Co. recently awarded a contract to D. T. Riddle for two power houses, fire proof in construction, to be built at Montour Mines Nos. 1 and 2, near Venice, in Washington County, to cost \$35,000. The buildings will be finished by early fall, when these mines will be placed in operation.

Buffalo, N. Y.—The Wickwire Steel Co. will add shortly a wire mill to its pig-iron furnaces on Niagara River just below Buffalo, expected to cost \$2,000,000 or more. It is expected that the Solvay Process Co., of Syracuse will also build a by-product coke plant on the Niagara near the Wickwire furnaces. The Niagara Ship Canal is complete and its use will reduce iron ore rates to the Wickwire plant from 15 to 25 cents a ton.

Whitesburg, Ky.—Representatives of the Roberta Coal Co. a subsidiary of the Slomp Consolidated Coal Co. recently organized have been through the Lower Boone's Fork section of this county making the necessary arrangements to begin, a million dollar coal operation on the Wright coal tract one mile from Kona, Ky. A second operation is to be started about one mile below Kona on the Kentucky river. Two mining cities will be built.

Omar, W. Va.—The complete tippie equipment being built for the Main Island Creek Coal Co. by the Link-Belt Co., of Chicago, is rapidly nearing completion. This tippie will be one of the most modern of its kind in this field, being all steel construction, equipped with a long apron conveyor for bringing the coal from the drift mouth to the tippie at the foot of the hill, where it is graded into lump, egg, nut and slack and any desired mixture of these sizes. The lump and egg are respectively delivered to picking tables and loading booms to insure each being delivered to the cars with a minimum amount of breakage. Bypasses are provided so that run-of-mine coal may be loaded directly into railroad cars without going over the screens.

Evansville, Ind.—Orders for the steel to be used in the \$250,000 tippie which the Deep Water Coal Co. will construct at Henderson, Ky., have been placed, it is reported at the local offices of the company. H. F. Allen, manager, is quoted as saying that the company is capitalized at \$10,000,000 and that an equal amount of 6-per cent. bonds, none of which are on the market, have been issued, while a barge company, capitalized at \$2,000,000, has been incorporated and will obtain its barges from Birmingham, work being rushed so as to be able to begin shipments in the fall. The company with its 210,000 acres of coal lands, mostly in Kentucky, is said to control the largest field in the world and, according to Mr. Allen, has a contract calling for the delivery of 5,000,000 tons of coal annually to a British broker at New Orleans. This firm's property will be worked by 48 shafts, of which 30 are on the program for the next two years.

NEW INCORPORATIONS

Terre Haute, Ind.—The Sunbeam Coal Co. has been incorporated with \$50,000 capital stock, to do a mining business. The directors are J. H. McLellan, Henry Hafer and H. P. E. Hafer.

Akron, Ohio.—The Interstate Mining Co. has been incorporated with a capital of \$300,000 to mine and sell coal. The incorporators are John P. Jones, E. J. Welty, H. B. Redding, W. J. Martin and R. M. Eckelberry.

Frankfort, Ky.—The Kentucky-Henderson Coal Co. has been incorporated for the purpose of developing Kentucky coal properties, with a capitalization of \$425,000, by J. A. Curtiss, L. C. Mizer and W. H. Hill, all of Cleveland, Ohio.

Cliff, Ky.—The Purity Cannel Coal Co. has been organized, with a capital stock of \$15,000, for the purpose of mining and selling coal. The incorporators are E. J. Halley, J. E. Snyder, John Hunley, Hiram Harris and A. J. Hannan.

Pittsburgh, Penn.—The Clifton Coal Co. has been incorporated to operate in Brooke County, W. Va. Capital stock, \$100,000. Incorporators: L. A. Burnett, Thomas Watson, J. J. Harter, Henry Rushton, George Sheppard and R. M. Atkinson.

Logan, W. Va.—The Big Eagle Coal Co., has been incorporated to operate in Logan County, W. Va. Capital stock, \$100,000; incorporators: W. R. Lilly, of Huntington, W. Va.; George J. Beddow, J. B. McCorkle, W. H. Tidman and R. M. Wilson, of Logan, W. Va.

Richmond, Va.—The Buck Coal Corporation has increased its capitalization from \$3000 to \$200,000. The officers of this company, which is engaged in the coal mining business, are as follows: President, L. R. Page; vice-president, Walter Leake; secretary-treasurer, John P. Leary, all of Richmond, Va.

INDUSTRIAL NEWS

Columbus, Ohio.—Appraisers for the property of the Maple-Gallia Coal Co., which is in the hands of receivers have been named as follows: Thomas McLeisch, A. G. Simons and Earl Lama.

Winchester, Ky.—West Virginia capitalists spent several days here recently consulting with Col. T. G. Stuart with regard to purchasing a tract of fine coal land in eastern Kentucky. It is reported that negotiations are about to reach a successful conclusion, though definite details are not forthcoming.

Charleston, W. Va.—The Lehigh Coal Co., a West Virginia corporation composed of Cleveland capitalists, has filed before the Public Service Commission a petition asking that the Buckhannon & Northern R.R. Co. be compelled to furnish it a siding for the opening of coal mines near Lowesville, in Monongalia County.

Sandusky, O.—The wooden freighter "Gogotic," loaded with coal, went aground July 7, on Mouse Island near Sandusky, the accident being due, it is said, to the lack of a shoal water mark, the buoy which marked the reef having disappeared. The vessel was able to get out of the shoal water after being lightered.

Pittsburgh, Penn.—H. B. Meller, of the School of Mines of the University of Pittsburgh, has announced that within a few weeks machinery will be installed for sampling and testing ores and coal. Following this installation free tests of coal from the Pittsburgh district mines will be made to determine its availability for various uses.

Middlesboro, Ky.—The Ferndale Coal Co., which operates a mine near here, has been sold by G. W. Knuckles, of Ferndale, to J. C. Adair, of Colmar. Mr. Adair has constructed a new tippie and made other improvements and will continue the company under its old name. Mr. Knuckles has returned to his farm south of Knoxville, Tenn.

Charlestown, W. Va.—The steamer "Robert P. Gillham," owned by the Campbell Creek Coal Co., struck a submerged rock in the Ohio river at Crown City, O., recently, and sank. The steamer was on its way from Cincinnati to the Great Kanawha river mines with empty barges. The members of the crew escaped but the loss on the boat was estimated at nearly \$50,000.

Philadelphia, Penn.—Announcement has been made that the entire issue of \$2,000,000 of 8% accumulative preferred stock of the new Temple Coal Co. has been sold. The preferred shares can be redeemed semi-annually at 105 and accrued dividends by means of a sinking fund to be created out of a surplus of net profits or out of funds advanced by the common stock holders for that purpose.

Cincinnati, Ohio.—It has been decided by the post office authorities here, as a result of an investigation of conditions in the coal fields in Eastern Kentucky to recommend the establishment of a railway post office on the Big Sandy branch of the Chesapeake & Ohio Ry. between Allen, and Wayland, Ky., for the purpose of handling the rapidly increasing amount of mail destined to points in the coal field.

Chicago, Ill.—The Sullivan Machinery Co. has announced the establishment of a new office at Juneau, Alaska. Bert B. Brewster, for several years associated with the St. Louis office of this firm, has been appointed manager in charge of the company's interests throughout the territory. A stock of rock drills, spare parts and supplies for same will be maintained at this office for the convenience of customers and clients in Alaska.

Pittsburgh, Penn.—A plan for refinancing the Four States Coal & Coke Co., operating in West Virginia, which failed last fall, is being submitted to the creditors. The majority of the \$6,500,000 capital stock of the company is controlled by John H. Jones through a trusteeship. The plan proposes the issue of \$2,000,000 6% gold bonds to mature Aug. 1, 1930, with a sinking fund of 5 cents per ton on coal mined after Aug. 1, 1919.

Coal Trade Reviews

General Review

Anthracite trade has touched the low point of the year, with buying somewhat less than customary. Eastern bituminous market under heavy pressure. Curtailment of operations and tendency to hold tonnages closely the most encouraging feature. Middle Western trade developing a steadily cumulative strength.

With operations at all the anthracite collieries heavily restricted, the bottom point of the usual summer lethargy has been touched, and the trade is now only marking time pending further developments. As a result of the financial stringency, there has been less than the customary amount of summer stocking. This is not only adversely affecting the current market, but will result in an abnormally heavy demand on the operators this fall. Some large orders from the upper lake ports is the only feature of interest in the current situation. The demand generally is failing to absorb even the heavily restricted production, and the break in stove coal down to less than circular quotations marks the final collapse of the one strong size in the market.

The Eastern bituminous trade is also laboring under the customary summer dullness, which is accentuated by a general hesitancy and tendency to curtail in all lines. As a result, fleets of coal carriers are lying idle and the most aggressive kind of competition prevails. The market is completely devoid of further absorbing power, both producers and consumers appear content to await further developments and there are some who consider it the dulllest season on record. The one encouraging feature is the fact that operators are showing an increasing disposition to close down rather than enter such a competitive market, with the result that tonnages are more closely held. The demand is best to the Westward and in the export business.

Operations in the Pittsburgh district are as heavy as at any time this season. A slight improvement is noted in some lines, as, for instance, the Lake trade, although it will not be long now before the Ohio coals become a big factor in this business. The large storage piles in different parts of Pennsylvania are slowly melting away. Consumers, however, continue making their own prices, quotations on prompt business being irregular and subject to heavy cuts, with slight concessions also on contracts. This long continued dullness for more than a year has proved most discouraging to the trade.

A distinctly better tone is noted in Ohio, due probably to the general optimism resulting from the record-breaking crop reports. Final details of the wage-scale, in the districts where an agreement has been reached, have been satisfactorily worked out, and it is now only a question of the operators getting their organizations lined up, before production is under way. An increased demand is reported by nearly all the sales agencies, particularly from the Northwest. Price cutting does not appear to be so general, and advances on August and September deliveries are already being discussed. The closing up of several important contracts in the Southern markets has toned up the situation there, although there is still an absence of any pronounced activity.

The Middle Western trade shows every indication of developing a strong, active market this fall. This assumption is apparently predicated upon the meager purchases throughout the usual storage period, and it is generally agreed in all quarters that a heavy production will be necessary to overcome the deficiency. Mines are already working somewhat stronger, while advances in the current circular are being freely discussed, and an increased call from the Northwest is noted.

ATLANTIC SEABOARD

BOSTON

Market without any material change. All grades in excess supply. Pennsylvania coals moving largely on spot orders. Better grades and Georges Creek leave mines only on orders. Anthracite still dull.

Bituminous—The fleets of coal carriers lying idle in the larger New England ports testify to the dulllest season on record. The market has been pounded so hard now for several weeks that there is practically no buying in any direction. On cars at Portland distress coal shipped from Hampton Roads has sold down to \$3, a price that nets a ruinously low return to the operator, if he is the party who stands in the breach. At Providence and at Boston there is no improvement, and most of the shippers have ceased to predict any.

One fair sized corporation order was closed last week with shippers of Pennsylvania coal, notwithstanding there was strong competition from the various Hampton Roads agencies. This development shows a purpose on the part of Pennsylvania interests not to be left out of the reckoning. The price must have been a low one but in these times it is something to keep mines in operation. Receipts on contract are noticeably less than a fortnight ago and stocks everywhere are pretty nearly at a maximum.

The Pennsylvania coals are having only a scattering business, although this is usually the season where shipments to this territory are at their height. So many shippers have been caught with heavy demurrage at the loading piers that very little tonnage is coming down except on specific orders. There is more firmness in prices than was looked for, most of the operators having concluded to keep their product in the ground rather than accept the low prices prevailing at competitive points. Georges Creek is notably firm in this respect but as much cannot be said for it on prices alongside New England points in transportation controlled by the operating companies.

Anthracite—There is no longer any delay on schedules for domestic sizes unless perhaps where there is required an undue proportion of stove. Until Sept. 1 there will be only a hand-to-mouth demand from this territory.

The retailers in Boston and nearby cities advanced prices July 6, to \$7.50 for egg and stove and \$7.75 for chestnut, delivered in teams, net tons.

Current prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	\$0.80@1.45	\$1.20@1.60	\$1.67@1.77	
Philadelphia*	2.10@2.70	2.4@2.85	2.92@3.02	
New York*	2.40@3.00	2.7@3.15	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				\$2.50@2.80
Boston*				3.15@3.63
Providence†				3.20@3.68

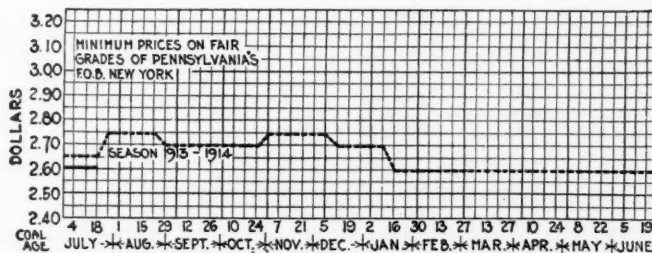
* F.o.b.

† On cars.

NEW YORK

Customary summer dullness, somewhat accentuated, prevails on bituminous. Buyers and sellers both waiting further developments. Anthracite consumers reluctant to stock because of adverse business conditions, but the trade is holding close to normal.

Bituminous—The New York soft-coal market is more remarkable for the complete absence of any new features than anything else. The customary summer dullness prevails in all directions and is probably somewhat accentuated by the



general hesitancy and tendency to curtail in all lines of industrial endeavor. Both producers and consumers seem to be content to rest quietly on their oars, pending further developments, whether for better or worse.

The International Paper Co.'s contract involving about 100,000 tons is reported to have been closed at 95c. The con-

tract for the New Haven subsidiary is still bending and further bids have been asked for on an additional 50,000 tons, making the aggregate tonnage involved about 180,000 tons. This business will be closed shortly, possibly during the current week.

In view of the heavy stress under which the market is laboring, prices are being remarkably well maintained. An occasional odd tonnage is reported on demurrage, but old traders in the New York market state that they have never before known tonnages to be so closely held in the face of such adverse conditions as now prevail. There is some slight call for lump coal and the demand from the West is beginning to come in, creating a better feeling in the trade. Prices are not quotably changed from the last few weeks, which we continue as follows: West Virginia steam, \$2.50@2.60; fair grades Pennsylvania, \$2.55@2.65; good grades of Pennsylvania, \$2.70@2.80; best Miller Pennsylvania, \$3.10@3.15; Georges Creek, \$3.15@3.25.

Anthracite—Much the same heaviness is noted in hard coal as characterizes the bituminous trade. While some companies report the situation about average for this season, there are others who see indications of an abnormally heavy market. Consumers are exceedingly backward about laying in their customary winter supply, except where arrangements can be made for long-term payments to dealers; as a rule the latter refuse to accept such business. This will result in the accumulation of only meagre stocks this summer and a consequent rush for coal when the winter trade opens up.

Curtailed operations are still the rule in the mining districts, most companies reducing to three or four days during the current week. Stove coal is still moving the best of all sizes, and even it is now relatively easy. Pea and buckwheat are being stocked by nearly all the companies, but not to the extent that might be expected, since their production is relatively light as result of the curtailed operations.

It is impossible to find a market for chestnut in any direction and egg coal is only in fair demand.

The New York hard-coal market is now quotable on about the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken.....	\$4.90	\$4.60@4.90	\$4.85	\$4.55@4.85
Egg.....	5.15	4.95@5.15	5.10	4.85@5.10
Stove.....	5.15	5.15	5.10	5.10
Chestnut.....	5.40	4.90@5.40	5.35	4.75@5.35
Pea.....	3.55	3.25@3.55	3.50	3.10@3.50
Buckwheat.....	2.80	2.55@2.80	2.50@2.75	2.00@2.75
Rice.....	2.30	2.15@2.30	2.00@2.25	1.60@2.25
Barley.....	1.80	1.55@1.80	1.75	1.25@1.75

COAL CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Class	Nationality	From	To	Tonnage
Orleans	Schooner		Baltimore	Key West	605
Wm. H. Yerkes	Schooner		Newport News	—Providence —Boston or —Portland	1211
King Lud	Steamer	British	Baltimore	Alexandria	2344
Giuseppe d'Ali	Bark	Italian	Norfolk	Trapani	1501
Augustus H. Babcock	Schooner		Baltimore	Crab Island and Jobos	1299
Fanny C. Bowen	Schooner		Philadelphia	Calais	892
Alma E. A. Holmes	Schooner		Philadelphia	Portland	1069
Coniston Water	Steamer	British	Atlantic Range	West Coast Italy	2362
Aboukir	Steamer	British	Philadelphia	Havana	2346
Blanche H. King	Schooner		Philadelphia	Calais	1021
Brina P. Pendleton	Schooner		Philadelphia	Calais	821
	Steamer	American	Atlantic Range	Tiburón or Mare Island	10,000
	Steamer	Foreign	Atlantic Range	Tiburón or Mare Island	6500
Vitalia	Steamer	Norwegian	Philadelphia	Bermuda	723

PHILADELPHIA

No improvement noticeable in anthracite. All sizes in easy supply, with possible exception of stove. Bituminous trade still dull, with little hopes for improvement in near future.

Anthracite—With the exception of stove size, for which there still seems to be a ready demand, the market is failing to absorb the output of the mines, even under almost 50% curtailment. One even hears of less than circular price for stove, which is about the only size that has not been offered at concessions. All sorts of prices are being made by the individuals in an effort to operate their mines at full time, but improvement will have to come quickly, or even they will find themselves compelled to limit work at their mines.

The tidewater market appears to be about the only point holding its own. That is to say, it is not growing any worse, but the orders are only coming in with sufficient volume to just about keep the fleets moving. There is no standing in line to have orders filled. Applications for shipments invariably find both transportation and coal available.

Prices at Tidewater are as follows:

	Circular	Individual
Broken.....	\$4.55	\$4.55
Egg.....	4.80	4.60 @ 4.75
Stove.....	4.80	4.80
Chestnut.....	5.05	4.80 @ 4.90
Pea.....	No market	No market

Bituminous—The market here is practically unchanged. It takes considerable work to land an order, even with the added inducement of a favorable price. Contracts are not coming in very quickly and the market is being played for even lower prices yet. There is little coal at tidewater without orders; orders have to be in hand before shipment for tidewater points, the lesson of heavy demurrage having made many shippers chary about taking any chances of disposing of it after arrival.

BALTIMORE

Demands of Western railroads stimulate bituminous trade. Shortage of labor at mines. Exports continue heavy.

The most stimulating feature of the soft-coal situation at present is the continued call for West Virginia and Pennsylvania coals for points west that have heretofore relied on the mines in that section. Demands from the Western railroads particularly, has aided in strengthening the situation and prices range about 15c. higher than on Eastern business. At present it is not so much a question of price in the Atlantic States region as that consumers do not seem to need any coal other than that moving on contracts. Even with the greatly lightened production there are reports here of a shortage of competent labor, especially from some sections of West Virginia. It is freely predicted that a busy fall will raise a general complaint along that line. Car movement continues poor.

Exports are still heavy and the big increase in the European demand is expected to more than offset the falling off in Mexican call and to make 1914 a banner year in this trade.

The anthracite dealers are now working under an increased schedule. Because of slack demand for storage some dealers gave substantial cuts on the June circular.

HAMPTON ROADS

Coastwise and foreign cargoes somewhat light, but a fair number of bunker steamers taken care of. Owing to holiday July 4 shipments arriving are not so heavy and accumulation of cars is about normal.

Dumpings over the piers at Hampton Roads for the week have been somewhat light, as there appears to have been a falling off in both export and coastwise cargoes. There have been a fair number of bunker steamers in port which has helped matters to some extent and kept piers operating. Some high volatile coal has been shipped to the New England market, but so far as can be ascertained there have been only one or two small cargoes and these were applied on contract. Of the Pocahontas and New River coal the heaviest shipments have been to Boston, with foreign cargoes to Dakar, Naples, Canal Zone, Venice and Santiago.

While circular prices of \$2.80 and \$2.85 are still being quoted on Pocahontas and New River run-of-mine and \$2/65 and \$2.75 for the high volatiles, there are reports, which cannot be confirmed, of some cuts being made in these prices. Practically all the large shipments during the week have been by steamer, few barges or schooners having been in port.

A number of mine operators were in Norfolk during the week attending the meeting of their association at Old Point Comfort and afterwards looking over the situation both at Norfolk and Newport News.

LAKE MARKETS

PITTSBURGH

Mining operations slightly increased, but not above previous records this year. Ohio becoming a competitor of Pittsburgh district by resuming operations. Prices continue quite irregular.

Mining operations are slightly improved, on the whole, over last week, and are approximately as heavy as at any time this season. There is a slight improvement in line trade, as factories which were closed for repairs are opening again. The steel mills have been operating practically as well as in June, and there has been little if any recent decrease in shipments to this industry. Retail trade continues very slack.

The outlook for Lake shipments is somewhat improved on the whole, but the partial settlement of the mine-run

payment difficulty in Ohio tends to remove a stimulus which the Pittsburgh district has hitherto enjoyed, as coal mining in Ohio will soon be on a fairly large scale. Prices in the Pittsburgh market continue irregular, with prompt coal, particularly slack, offered at deep cuts from the circular, and circular prices occasionally cut in the case of very desirable contracts. There remain many consumers whose contracts expired Apr. 1 but have not been renewed. Circular prices remain: Slack, 80@90c.; nut and slack, \$1.05; nut, \$1.25; mine-run, \$1.30; ¾-in., \$1.40; 1¼-in., \$1.50 per ton at mine, Pittsburgh district.

BUFFALO

Still moving slowly and no prospect of a stir. Railroads holding off, though some are obliged to buy. Bituminous shippers generally pessimistic, but anthracite companies are confident.

Bituminous—There is little encouragement in the trade now, and the movement is slower than it should be ordinarily. The contract orders are as light as anything else and no stir of any consequence is looked for right away.

The railroads were expected to buy a little more liberally this month, but have not done so. Although the big storage piles continue to melt away, new purchases are few. The Grand Trunk Railway has asked for tenders, but not for bids, probably in order to find out the real state of the market and then buy or not, as seems best. Coal shippers are on the lookout for orders, but without expecting to get much business.

The consumer is making his own prices to a great extent, buying when he has room for the coal and in that way keeping stocked up to the limit all the time.

While the ordinary coals are selling at low prices, the better grades are still holding up pretty well. Slack is not as firm as it was. Quotations are regularly on the basis of \$2.80 for Pittsburgh lump, \$2.70 for three-quarter, \$2.55 for mine run and \$2.15 for slack, with Allegheny Valley sizes 15 to 25c. lower.

Anthracite—There is no activity in anthracite except in the amount going to the Lake trade. When it was announced that there had been about 25% more shipped from here by Lake in June than during the same month last season, some of the shippers declared that they were going to keep the record up, as they were getting heavy orders from Upper-Lake docks and they would put on night handling crews if necessary. One dock has already done so. The amount reported for the week by the custom house was 191,000 tons, which is above the June average.

The local anthracite trade is just active enough for shippers to notice that the stove size was scarce and is sure to make trouble when the fall trade sets in. As a rule the small retail delivery force is disbanded and will remain so till September, when the rush will begin.

TORONTO, CAN.

Market continues dull and will probably remain so until the crops begin to move.

The market remains dull and featureless in sympathy with general industrial conditions, which continue quiet and appear likely to remain so for some time. It is hardly probable that the situation will show any considerable improvement until after the harvesting of the Western crops. There are ample supplies of coal on hand, but purchasers as a rule are not ordering except for immediate needs. Quotations are as follows: Retail, anthracite, egg, stove and nut; \$7.50; grate, \$7.25; pea, \$6.25. Bituminous, steam, \$5.25; screenings, \$4.35; domestic lump, \$6; cannel, \$7.50. Wholesale f.o.b. cars three-quarter lump, \$3.68; screenings, \$2.64.

TOLEDO

Demand somewhat better though still light. Lake movement slow due to congestion at the upper ports. Labor difficulties assuming serious proportions.

While there has been some improvement in the general call for coal, especially steam grades, conditions are not greatly changed. Dealers for the most part seem to have plenty of coal to carry them through and buying is only scattering. The factory demand is improved and a big call for threshing coal is anticipated shortly. There is some anxiety expressed over the Pocahontas situation, as it is impossible for local concerns to get enough smokeless coal to fill their regular orders.

The Lake traffic is light for both coal and ore. The total amount of ore passing through the Toledo port this season is 216,071 tons, while something less than five million tons of coal has been shipped up the Lakes. This is an unusually small percentage for this port and is due to the fact that the upper docks carried over so much coal to the general depression in business. A feature of the Lake shipments is the large amount of coal consigned to Northwestern Canadian points, due to the rapid growth of that section of the country.

COLUMBUS

Increased demand and further negotiations on contracts. Domestic active. Lake trade will be the most important feature for the time being.

Sales managers of operating and jobbing concerns report an increase in the demand for coal. This is especially true of steam users who have been consuming West Virginia and Kentucky coal to a large extent. Contracts for the coming year will now be taken up with the resumption of mining. Railroad contracts are also attracting some attention, as only a few have been closed.

In the domestic trade considerable activity also developed. Dealers have some stocks of West Virginia fuel, but are looking around to purchase Ohio coal. There is a preference shown for Pocahontas and West Virginia splints, but a large demand is always prevalent for Hocking Valley lump and three-quarter inch.

Lake trade is running along quietly, but with the resumption of mining a larger tonnage is expected to be shipped to the Northwest via the Lakes. This will be the bulk of the business for the time being. Up to date the Hocking Valley docks at Toledo have handled about 1,000,000 tons.

Prices in the Ohio fields are:

	Hocking Valley	Pittsburgh	Pomeroy	Kanawha
Rescreened lump.....	\$1.50		\$1.65	\$1.50
1½ inch.....	1.40		1.50	1.40
¾ inch.....	1.30	\$1.20	1.35	1.30
Nut.....	1.25		1.25	1.20
Mine-run.....	1.10	1.05	1.15	1.10
Nut, pea and slack.....	0.80		0.85	0.80
Coarse slack.....	0.70	0.70	0.75	0.70

CLEVELAND

Coal receipts relatively light and retail trade is not very active. Lake shipping slow with some vessels loaded before the opening of navigation, still in port. Wage-scale settlement will increase shipments in this business.

Coal receipts over Sunday were not particularly heavy; 150 to 200 cars of coal were all that were on track Monday morning. The market is on a single price basis and profits to sales departments and brokers are small. The call is mostly for slack which is selling at \$1.55 to \$1.60. No. 8 from the West Virginia side, Youghiogheny, and Pittsburgh are the principal kinds on the market. Very little Fairmount is coming in.

In coarse coal, mine-run and three-quarter, Fairmount has the best of it as Youghiogheny and Pittsburgh are held at higher prices. West Virginia No. 8 also has been sold in this market. Mine-run is being disposed of at \$1.95 to \$2. The retail trade has not opened up very briskly. Anthracite and coke, which command a discount to the consumer prior to Sept. 1, are not moving as well as other domestic fuels, but all trade is rather slow.

The Lake trade is also slow. Last week it was estimated that there were 65 ships temporarily out of commission which represent about 15% of the tonnage of the Lake Carriers' Association. Many of these boats were put in ordinary last week and more are expected to go in this week; a number of these have coal that was loaded before the opening of navigation. Some of the ships that left on their first trip during the last week were sent out to deliver storage coal.

There is nothing serious in the Lake condition as it has been known for some time that not more than 60% of the tonnage is needed. The last week was the dulllest so far this season and no material change in the traffic is expected this month.

With the resumption of mining in the Kanawha field of West Virginia, Lake coal was promised boat managers for this week. The settlement in the Hocking and Cambridge districts, among the larger Lake shipping fields of Ohio, leaves only the No. 8 section, among the Lake shipping districts, not ready to resume operations. A settlement is predicted for the No. 8 field within the next few weeks and by the first of August, Lake shipping should be improved.

Spot and shipping quotations are as follows for coal delivered at Cleveland:

	Pocahontas	Youghiogheny	Fairmount	W.Va. No. 8
Lump.....	\$3.60			
Lump, 1½ in.....		\$2.35		
Lump, ¾ in.....		2.25	\$2.05@ 2.10	\$2.05@2.10
Egg.....	3.60			
Mine-run.....	2.60	2.10@ 2.15	1.95@ 2.00	2.00
Nut.....		2.20		
Slack.....	2.20@ 2.35	1.55@ 1.60	1.65	1.55@ 1.60

CINCINNATI

Slow improvement. Light trade. Anticipation of a shortage later the most favorable factor at the moment.

While manufacturers are still taking unusually small quantities of screenings, the market as a whole has a dis-

tinctly better tone, and the trade is hopeful that this will continue to increase until something like a normal situation is reached. In the smokeless trade practically all grades are moving freely, even slack doing better in this line than in others. Things are not so active among producers of splint, but the movement is much freer, and as soon as the demand for slack increases somewhat operators expect good business.

In some quarters the early resumption of work in the Ohio fields is expected to furnish ample supplies, but present indications are that only a portion of the mines will go to work. With the Northern and Northwestern markets taking heavy shipments from West Virginia and Kentucky fields, the outlook is for a good demand and strong prices. The tendency toward price-cutting has already ceased and the chances are that there will be a sharp advance for August and September delivery when orders begin to come in.

DETROIT

Market rather weak, but with a fair tonnage of small orders coming in. Uncertainty in the business outlook the controlling factor.

The situation here continues practically unchanged, a good many small orders being taken for West Virginia and Kentucky fuel, which altogether are aggregating a fair tonnage. Screenings seem to be in substantial demand, with shipments just about sufficient to take care of requirements. In spite of the feeling in all quarters that quotations will experience a sharp advance with any improvement in general business conditions, buyers are still holding off purchasing. This is probably due mostly to the uncertainty, manufacturers still being in doubt as to just what their requirements will be, and not caring to obligate themselves until the outlook becomes better defined.

COKE

CONNELLVILLE

Market stagnation slightly relieved. Foundry coke doing fairly well. Production and shipments practically stationary.

The coke market, which at the beginning of July had drifted into a state of stagnation, is beginning to look up a trifle. Two enquiries for furnace coke for second-half have appeared and there are prospects of coke business being done. Toward the latter part of the month the consumers who bought furnace coke for July only will be in the market again. Closing of foundry coke contracts continues, although usually nearly all such contracts are closed in June. A fairly large contract has just been closed for about 18 cars weekly of high-grade foundry coke over the next twelve months, at \$2.50 at ovens. The market is quotable as follows: Prompt furnace, \$1.75@1.80; contract furnace, \$1.90@2; prompt foundry, \$2.25@2.35; contract foundry, \$2.35@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended July 4 at 259,252 tons, a decrease of 2301 tons, and shipments at 272,902 tons, an increase of 2505 tons.

BUFFALO

Market dull in every department with no indications of improving.

The demand for all grades of coke is light, with no prospect of any improvement right away. If possible foundry grade is duller than furnace. Certain developments here lately have called attention to byproduct coke, which is likely to become more popular soon. Quotations remain on the basis of \$4.25 for best 72-hr. Connellsville foundry and \$3.25 for stock coke.

BIRMINGHAM

No change in the coke situation. Market quiet.

There is practically no change in the coke market this past week, though the sales of foundry coke were somewhat larger than last week. There is nothing doing on furnace coke.

ST. LOUIS

Coke is extremely slow, though there was a slight increase last week. Indications point to a turn for the better in a week or two.

CHICAGO

A small amount of coke is being handled on the spot market at varied prices. Retail dealers have ceased buying byproduct coke and the market is unusually soft. Gas house also is weak. Connellsville and Wise County are quoted at \$5@5.25; byproduct, egg, stove and nut, \$4.75; gas house, \$4.15.

SOUTHERN

BIRMINGHAM

Small tonnage of lump coal being moved and few sales for future delivery. Steam grades stronger than last week. Signing up of several important contracts has toned up the market.

While the market on lump coal has not improved during the past week, and only small orders are being booked, with the larger dealers and consumers still holding off, prices have remained about stationary. Little improvement is looked for during the next 30 days. The market on steam fuel seems to be much stronger than last week, and all operators are more optimistic than they have been for several months past.

The placing of several large railroad and industrial contracts within the past 10 days has strengthened the market, and while the majority of mines are still running only from three to four days a week, preparations are being made to put many on a full-time basis. Blacksmith coal, while falling off slightly in tonnage, remains firm at \$2 to \$2.25 for the best grades and \$1.75 to \$2 for the lower grades, with the business satisfactory. The outlook in iron is somewhat better and prices are expected to improve during the last quarter.

LOUISVILLE

Demand remains quiet but a generally better feeling prevails. Some coal on track.

Kentucky operators report that the market seems to have shown improvement in the week just passed. Not that there has been any advance in prices, but the demand has increased and the market's powers of absorption is larger than it has been of late. Requirements in an industrial way are not as extensive as the operators would like, though stocks of steam sizes are being reduced.

An unusual feature during the week was a large accumulation of coal on track for which there were no buyers. The open market is not as steady as it might be, although improvement in this respect is looked for shortly inasmuch as the larger operators are getting well booked up on their prospective outputs.

MIDDLE WESTERN

INDIANAPOLIS

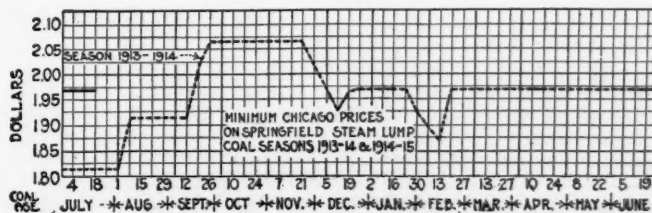
Movement of lump coal to the Northwest and its use by threshers has caused an improvement. No slack on market, demand largely exceeding supply, quotations ranging 90c. to \$1. Mines making somewhat better time.

There is some improvement, due largely to the fact that the Northwest demand for lump coal has begun. It is about two weeks late this year. Chicago is also taking some of this grade; Indiana users do not buy until fall. Indianapolis retailers intimate that prices will advance further Aug. 1. This will probably hurry up orders from local buyers. Slack is said to be out of the market, with three customers for every car available. It is easy to obtain 90 to 95c. a ton and \$1 is the top. The mines are doing a little better, particularly in the Terre Haute field. In the Clinton district, the Miami Co.'s No. 8 has started up again and the company is also sinking a new mine.

CHICAGO

Light movement of domestic coal may result in a severe shortage next fall. Current market continues dull and uninteresting.

A slight improvement is noted in the steam coal trade, but a shrinking in the volume of domestic business. Because of the small amount of domestic coal moving to consumers' bins, wholesalers fear there will be serious congestion next fall when the grain movement is at its height and cars are scarce.



Conditions in the smokeless field remain about the same. Curtailment of output has equalized the demand and supply; major producers are able to obtain \$1.25 for smokeless mine-run and circular price for lump and egg. There are a few concerns which sell smokeless mine-run at \$1@1.10. Orders for Hocking coal are coming in slowly. Production ceased three months ago and will not be resumed for at least ten days.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W.Va.
Domestic lump.....	\$2.07	\$2.40@2.55	\$2.12	
Steam lump.....	1.97		1.97	
Egg.....		2.40@2.55		\$4.05
Mine-run.....	1.87	2.15@2.25	1.87	3.30
Screenings.....	1.67	1.95	1.67	

Quotations for Harrisburg coal are: Domestic lump and egg, \$2.40; steam lump, \$2.25; mine run, \$2.15@2.25; screenings, \$1.95; No. 1 nut, \$2.25; No. 2 nut, \$2.40.

Carterville prices are: Lump and egg, \$2.40; No. 1 washed, \$2.55; No. 2 washed, \$2.45.

ST. LOUIS

June and July buying so light that a sharp rush to cover is anticipated shortly. Car shortage this fall will create further difficulties. Market flat at the moment.

Careful investigation among the retailers in this section develops the fact that 60% of the consumers that usually buy in the month of June have not placed their orders yet, and that the July buyers will be in the same proportion. When the delayed orders start to come in, the demand for domestic coal will probably cause prices to go higher than they have for a number of years at this season. This will be further accentuated by the car shortage, which will be an important factor in making prices. The financial condition of the coal carriers have prevented them from keeping their equipment in good shape or buying any new cars, and the car shortage will be a serious menace.

The market at the present time still continues stagnant; there is absolutely no buying to speak of with the exception of a little country business. One of the most remarkable situations in the St. Louis market this year is the fact that the anthracite tonnage will drop off not less than 25%. Smokeless tonnage will also lose from 25% to 40%, while coke will advance. The greatest strides will be made in Carterville coal, which the dealers are pushing aggressively. Some coals from the high grade districts are being quoted at extremely low prices, and especially that from the neighborhood of West Frankfort. Standard lump and screenings are selling at the price of mine-run.

The prevailing prices are:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump.....			\$1.15	\$0.85	\$0.95
3-in. lump.....					
6-in. lump.....	\$1.15@1.35		1.25	1.00	1.15
Lump and egg.....	1.85@2.15	\$2.00			1.15
No. 1 nut.....	1.15@1.30				
Screenings.....	0.85@1.30		0.80@0.85	0.75	0.75@0.80
Mine-run.....	1.00@1.15				
No. 1 washed nut.....	1.30@1.40	2.25	1.50		
No. 2 washed nut.....	1.20@1.30		1.35		
No. 3 washed nut.....	1.15@1.25				
No. 4 washed nut.....	1.15@1.25				
No. 5 washed nut.....	0.70@0.75				

KANSAS CITY

Business ahead of last year. Collections good and an active trade anticipated the balance of the season.

Business in Kansas City has been considerably ahead of the corresponding period of 1913. Reports from the harvest fields are that the growers are stacking their wheat in response to admonitions from the state agricultural board. This means, according to operators, that threshing will continue well into August, and more coal for that purpose will be needed.

Demand from other sources is normal. Collections are much better, and are expected to show steady improvement as the agriculturists discharge their debts. Operators in the Pittsburg field were retarded somewhat by damage to electrical equipment during the past week. All of the mines thus affected have resumed their operations, with an average of about five days.

PORTLAND, ORE.

Customary midsummer conditions prevail and the market is dull and uninteresting.

There is very little doing here in the coal trade. Dealers report very little demand for storage coal, but this is expected to begin soon. There has been no change in quotations since the summer prices were put into effect, about a month ago. The mines in the Pacific Northwest are working short time for the present. There is said to be no probability of any Australian coal being imported here this coming fall.

PRODUCTION AND TRANSPORTATION STATISTICS

THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended July 1, as follows:

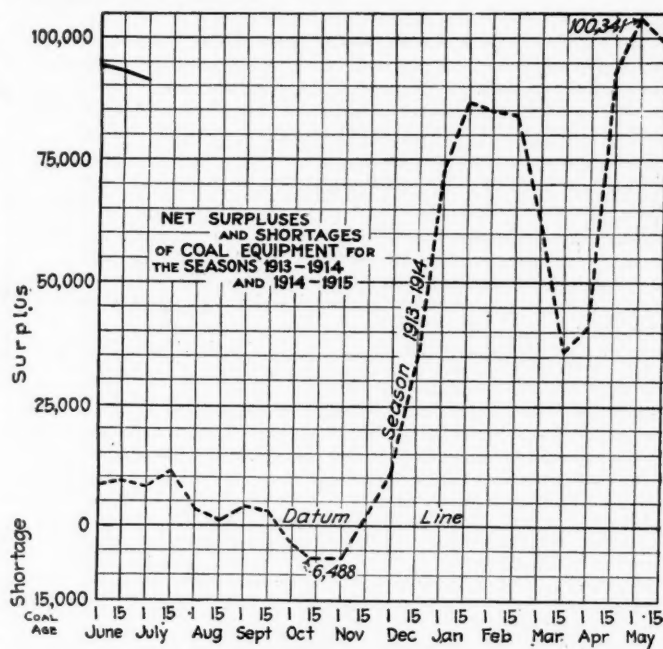
	Surplus	Shortage	Net*
New England Lines.....	723	26	697
N. Y.; New Jersey, Del.; Maryland; Eastern Penn..	18,769	0	18,769
Ohio; Indiana; Michigan; Western Pennsylvania...	42,012	200	41,812
West Virginia; Virginia, North & South Carolina...	7,447	0	7,447
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida.	9,369	0	9,369
Iowa, Illinois, Wis., Minn.; North & South Dakota.	7,055	9	7,046
Montana, Wyoming, Nebraska.....	954	0	954
Kansas, Colorado, Missouri, Arkansas, Oklahoma...	2,147	154	1,993
Texas, Louisiana, New Mexico.....	107	20	87
Oregon, Idaho, California, Arizona.....	2,699	21	2,678
Canadian Lines.....	0	0	0

Total..... 91,280 430 90,850

	Mar. 1	Mar. 15	Apr. 1	Apr. 15	May 1	May 15	June 1	June 15
Surplus.....	64,822	39,133	41,055	92,139	100,370	99,664	94,770	93,520
Shortage.....	1,394	3,282	615	24	29	313	7	49

Net*..... 63,428 35,851 40,440 92,115 100,341 99,351 94,763 93,471

*Bold face type indicates a surplus.



BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during April and May of this year and last year:

	April		May	
	1914	1913	1914	1913
Coal.....	2,131,812	2,516,367	2,995,812	2,357,119
Coke.....	343,862	400,317	301,163	434,898
Total.....	2,475,774	2,916,684	3,296,975	2,792,017

FOREIGN MARKETS

GREAT BRITAIN

July 13—There is a better demand for Admiralty-List coals, and prices have a harder tendency. Very best descriptions are notably firm, and further large orders are expected from the British Admiralty.

Approximate quotations:

Best Welsh steam.....	\$5.04@5.28	Best Monmouthshires ...	\$4.08@4.14
Best seconds.....	4.44@4.68	Seconds.....	3.84@3.90
Seconds.....	4.38@4.50	Best Cardiff smalls.....	2.58@2.64
Best dry coals.....	4.44@4.50	Seconds.....	2.46@2.52

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those of Monmouthshire descriptions are net f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

Coke is quoted at: Special foundry, \$6.36@6.72; good foundry, \$5.52@6; furnace, \$4.92@5.28.